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T. PASCOE,

*Minister of Agriculture.*

## POINTS FOR PRODUCERS.

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### **A Promising Fodder Crop.**

During the past few years the Department of Agriculture has been testing the sunflower as a summer fodder crop, and the results have tended to confirm the belief that this plant would be of considerable value in certain districts in South Australia. America is also giving attention to this plant as a forage crop, and at the Montana Agricultural Experiment Station investigations were commenced in 1915. It is now reported that Mammoth Russian sunflowers have been successfully and satisfactorily used for both soiling and silage purposes for the last four years. Little difficulty has been experienced in getting stock to eat the silage, and no objectionable flavors or odors could be detected in milk from cows fed on green sunflowers or sunflower silage.

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### **An Advertising Medium.**

Whether we like it or not, it must be admitted that the moving picture has established itself as a very considerable factor in our national life. It appeals to the people, and because it does, it appears to offer possibilities from an educational and commercial point of view. Elsewhere this fact has been recognised. With the object of advertising the resources of the Union, the Government of South Africa is preparing a number of films depicting farm scenes and operations in South Africa. These films, which are to illustrate tobacco growing and manufacture, fruit-growing, dairying, cotton-growing, forestry, irrigation, among other industries, are to be shown first throughout the Union, and subsequently in a number of overseas countries. America, too, has been quick to realise the value of this medium of publicity, for the Department of Agriculture of the United States is preparing films depicting the swine industry, and showing all important types of American pigs. These are to be shown in South America, where there is a market for the swine of the United States.

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### **The Old Year and the New.**

Time has shed 1920 as an old coat, but before it goes to the old clothes dealer, History, we may turn out the pockets, and once more study the plans placed therein whilst it was new. Plans of big things there are, but none, perhaps, of more abiding interest to the agriculturist than the packet labelled "The Agricultural Bureau." Thirty years ago the curtain was rung up on this institution. In the play of its development there has been nothing of an anticlimax, but a steady unfolding of the plot. The stage is now limited only by the boundaries of the State, and the growing army of players numbers nearly six thousand agriculturists. And there is room for more. The play was planned to provide a part for every tiller of the soil, and not until he takes his place will the cast be complete.

But of 1920, and its plans. Not all that was planned has matured. Nevertheless a glance back gives a pleasing vista of accomplishment. Pleasurable and profitable Branch meetings have been the rule. With the interchange of experience and ideas much has been learnt, and perhaps, what is more important, that spirit of mutual helpfulness and comradeship, which does so much to stay and support the individual, has been vitalised.

New Branches have been formed in thirteen centres, viz., Colley, Kilkerran, Lone Gum, Kimba, Neeta, Saddleworth (women), Alawoona, Younghusband, Glossop, Barmera, Williamstown, Black Springs, and McLachlan. Conferences were held at Kadina, Melrose, Millicent, Murray Bridge, Riverton, Strathalbyn, Lameroo, Blackwood, Minnipa, and Karoonda. Each was a pronounced success, but none more so than the Annual Conference held in Adelaide during September. Individual Branches have rendered outstanding service to their particular districts, and the Bureau as a whole has ministered to the wellbeing of the agriculturists of the State.

And Time now wears its new coat of 1921. Into the pocket of that garment we must place our plans, remembering that we are to be judged not by what we have done, but by what we are doing. To wrap ourselves in the complacency of past achievement will mean a monument to neglected opportunity; to work enthusiastically and intelligently will continue the Agricultural Bureau in its career as a vital force in the rural life of South Australia.

#### **Influence of Milk Records on Prices of Cattle.**

In recent years milk recording in Scotland has had a remarkable effect on the prices of good milk record cows and their progeny at both public and private sales. Auction sales of young bulls and other milk record stock at the instance of well-known breeders have now become common, either at the farms of the owners or at special sales at market centres, when the milk records or the milking pedigrees of the animals are stated in the catalogue of sale. Something still depends upon the appearance of the animal, but if, in addition to good appearance, there is a good milk record for the animal, or for the dam and grand-dams, the prices now obtained are almost fabulous compared with pre-record days.—*The Scottish Journal of Agriculture*.

## **PARAFIELD EGG-LAYING COMPETITION, 1921-1922.**

### **NEW STANDARD SECTION.**

In order to meet the wishes of breeders of standard or high-class poultry, the Hon. the Minister of Agriculture has approved a separate section in the Laying Competition. This section will begin on April 1st, and all competing birds will be judged by a special committee, in accordance with the various standards, before being admitted as competitors.

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

"J. M. W.," Hynam, reports sow that has lost use of hind legs.

Reply—This symptom appears in several diseases, or it may be due to an injury. Put her in a sty by herself, provide plenty of clean, dry bedding. Give her light, easily digested food. Clear out the bowels with a dose of Epsom salts, 3ozs. This may be given in the feed.

"E. A. K.," Murray Bridge, has Friesian bull calf, seven months old, with only one testicle. Inquirer asks if there is any possibility of the bull not getting calves.

Reply—In this case the other testicle has not descended into the scrotum, but it may do so later. If the one testicle is normally developed he will get stock, but a proportion of his bull calves are likely to have a similar defect.

"J. D. A.," Karoonda, asks treatment for cow with small hard scabs on teats. Reply—I recommend you to try the following preparation:—Friar's balsam, 1oz.; glycerine, 3ozs.; mix. Apply after each milking with a soft brush.

"R. N.," Solomontown, reports three cows, udders very swollen in one quarter. milk is lumpy.

Reply—The disease is mammitis (inflammation of the udder). To have a satisfactory termination treatment must be adopted early. These cases require thorough milking of the affected quarter at short intervals, frequent warm fomentations, and gentle hand rubbing. Belladonna ointment is useful in the early stages, and may be applied for the first few days after fomenting and drying the quarter. Cows suffering from mammitis should be milked after the others. Lameness is a common symptom of this disease.

"A. B.," Barunga, reports:—(1) Hog, injury to back, unable to walk straight. (2) Cow with lump on udder just above one of the teats. (3) Cattle dog with mange.

Replies—(1) The condition you describe is common to several diseases. It occurs in some diseases of the nervous system, constipation, worms, and in injuries of the region. Place him by himself in a clean, dry, and well ventilated sty. Provide plenty of bedding. Put him on light, easily-digested food and give him a dose of purgative medicine, such as Epsom salts, 3ozs. to 4ozs. in his feed. (2) These fibrous swellings at the base of the teat will not respond to any treatment. (3) Try the following wash:—Boil together in kerosine tin 1lb. of quick lime and half a pound of sulphur with a gallon of water. Allow this to simmer for an hour or two. Take it off the fire. Make up to 1gall. with water. Let it settle over night. Pour off the clear fluid and bottle it for use. Clip off the hair from the affected parts. Paint on the lotion with a swab. Several applications will be necessary.

"E. M. P.," Mount Compass, has horse left out in paddock all night with collar on. In the morning top of collar was jammed over the animal's eyes, and bottom lip very swollen. Experiences difficulty in feeding.

Reply—The swelling and twisting of the upper lip are due to an injury to the nerve, causing partial paralysis. If there is any difficulty in feeding keep him on

ft. easily-digested food. He will feed better out of a deep vessel. If necessary tie him up use a neck strap. The application of a little red blister down the side of the cheek is sometimes useful, applying to the side which the lip is drawn down. Where the paralysis is not complete the termination is usually favorable.

"A. G. P.," Muljarra, reports horse, six years old, with apparently blind eye. The upper lid is inflamed, and white, thick matter is being discharged. A white membrane covers the eyeball.

Reply—The symptoms are those of an inflammatory condition of the organ. Examination should first be made for some foreign body, such as grass seed, &c. While the condition is acute, frequent fomentations of hot boracic lotion are useful. Use about a tablespoonful of boracic acid to a quart of water. Afterwards use a little yellow oxide of mercury ointment, half strength. Place a small piece of gauze under the lid daily. The cloudiness is a result of the inflammation, if it is clearing up satisfactorily use the following lotion:—Sulphate of zinc, 12 grains; tincture of opium, 2 drams; water, 4ozs.; mix. Apply a few drops daily with an eyedropper.

"S. S.," Dawson, has colt recently castrated, penis hangs out, and frequent attempts are made to pass water. Animal turns its head around towards flanks.

Reply—As the incisions have healed and there is no local swelling, it is probable that the colt has obstructive colic. Suitable treatment for this condition is the administration of a drench, such as turpentine, 1oz.; raw linseed oil, 1 pint. Enemas of warm, soapy water are also useful. If the appetite is not completely restored small feeds of mash should be given, and after the attack has passed off carefully and restricted feeding is necessary.

Hon. Secretary, Agricultural Bureau, Wirrabara, asks what is a good and quick remedy for colic.

Reply—The safest remedy for colic in horses is the following drench:—Aromatic spirits of ammonia, 1oz.; turpentine, 2ozs.; raw linseed oil, 1 pint to 1½ pints; mix. This drench must be administered carefully. Frequent enemas of warm soapy water are also a useful part of the treatment. This treatment may be adopted whenever the pain is constant though not of an acute nature, and in flatulent colic. In spasmodic colic the pain is acute, but there are intervals of relief, that is, the pain is intermittent. Chlorodyne, 2ozs., in a pint of lukewarm water is useful in these cases, and may be repeated in half doses every three or four hours until relief is obtained.

"W. B. P.," Edithburgh, has horse, breathes very heavily with widely dilated nostrils. When breathing the lungs are apparently emptied, and the stomach contracts as though to drain the lungs.

Reply—The case is one of broken wind. The disease is incurable. Treatment is only palliative. Careful dieting is necessary. Water before feeding, and do not work immediately after feed. Working on a full stomach is harmful. Give small feeds of nourishing food. A little molasses in the feed is useful.

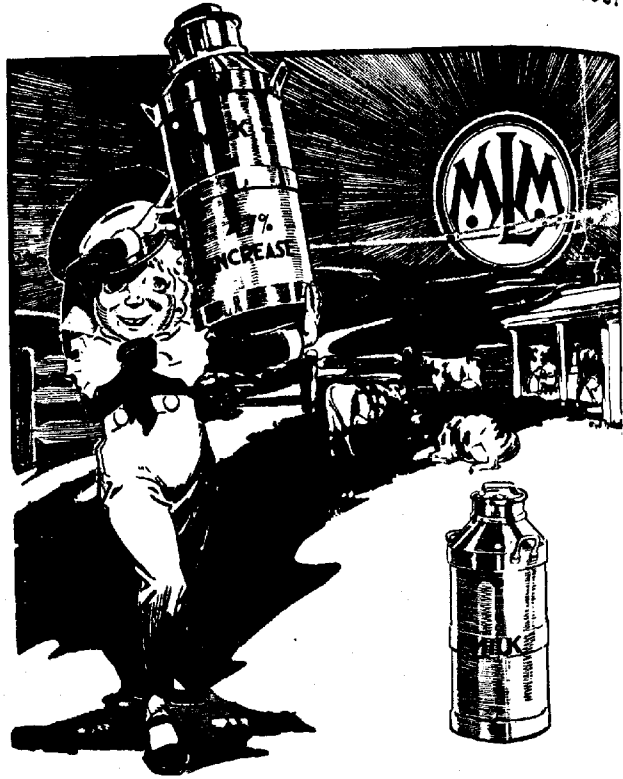
"L. S.," Strathalbyn, has mare, 16 years old, knees swollen and legs very stiff. The swellings are soft.

Reply—This condition often results in refractory lameness. Complete rest is necessary. Try the following ointment:—Iodine of potash, 1oz; vaseline, ½lb. Under the iodine of potash, melt the vaseline and mix thoroughly. Apply a little daily with plenty of hand rubbing.

Hon. Secretary, Agricultural Bureau, Green Patch, reports two cows, frequently lying down, walk very stiffly. Milk yield has decreased, and animals do not chew cud. Is it advisable to use the milk?

Reply—I recommend you to give a purgative drench consisting of Epsom salts, 1 treacle, 1 cupful; water, 1 quart. Follow this with one flat teaspoonful of powdered nux vomica mixed with a little treacle and given daily on the tongue. Discontinue the use of bone meal and mash diet. It is not advisable to use the milk.

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"O. F.," Yadnarie, has horses, in good condition, but drowsy and sluggish well fed, but losing condition; animals have attacks of coughing at frequent intervals.

Reply—Give the following medicine:—Mix, chlorate of potash, 4lb.; kerosine, 1lb.; glycerine, 1lb. Give about one tablespoonful two or three times daily, smearing on tongue and back teeth.

"J. H. K.," Yadnarie, reports horses constantly rubbing their shoulders against trees and posts.

Reply—The itching is probably due to the effects of skin parasites. Apply Cooper's milk oil fluid. Use about 3ozs. to a gallon of warm water, wash the shoulders daily for a few days, or use kerosine emulsion made by dissolving 1lb. of soap in a gallon of hot water and adding 1 pint of kerosine. Mix thoroughly and apply warm.

Hon. Secretary, Agricultural Bureau, Meadows, asks remedy and treatment for fistula.

Reply—A fistula is a wound discharging through a tube or pipe-like structure. A common situation of fistula is at the wither (fistulous wither). They occur in other situations, such as the poll (poll-evil), foot (quitter), after injuries to the teats (lacteal fistula), and as a result of injuries to the salivary glands of the horse. The term is most frequently applied to fistula of the wither. This condition is often caused by bruising from ill-fitting saddles. Horses with high withers are most likely to be affected. The only effective treatment for fistula of the wither is to open it with a clean, sharp knife, so as to provide for the drainage of all the cavities, remove all dead tissue, and daily flushing out with antiseptic solution.

## DEPARTMENTAL DOINGS.

### AMONGST THE AGRICULTURISTS.

During the month of December the annual tour of the district by the South-Eastern Branches of the Agricultural Bureau took place, in which the members were accompanied by the Director of Agriculture (Professor A. J. Perkins).

The Acting Secretary of the Advisory Board (Mr. H. J. Finnis) in company with the Manager of the Berri Experimental Orchard (Mr. C. G. Savage), visited Waikerie, Moorook, Barmora, Berri, and Renmark, and addressed meetings of the Agricultural Bureau in each centre.

The Poultry Expert (Mr. D. F. Laurie) addressed the members of the Pompoote Branch of the Agricultural Bureau.

The Assistant Dairy Expert (Mr. H. J. Apps) visited Melbourne, Mount Barker, Myponga, Kapunda, and Gawler.

## SOME FEEDING TESTS WITH PIGS.

[By ARTHUR J. PERKINS, Director of Agriculture.]

The Metropolitan Abattoirs Board has recently placed on the market two meals prepared from its waste products and intended for the use of pigs; they are known respectively as "Pig Meal" and "Pig Compo." Some time back I was asked by the Board to test the value of these meals on one of the Government Experimental Farms; this I agreed to do, and the supervision of the tests was placed in the hands of Mr. F. E. Waddy (Manager of the Turretfield Experimental farm).

### COMPOSITION OF THE MEALS.

These meals have been analysed by the Director of Chemistry, with the following results:—

	Pig Meal.	Pig Compo.
Moisture . . . . .	8.9	7.9
Ash . . . . .	9.1	14.4
Protein . . . . .	60.0	56.3
Fat . . . . .	14.0	13.9
Undetermined . . . . .	8.0	7.5
Total . . . . .	100.0	100.0
	Per Cent.	Per Cent.
Tricalcium phosphate . . . . .	6.3	10.5

These two meals differ mainly one from the other in their mineral contents, and this difference is apparently to be attributed to the fact that definite proportions of crushed bones have been used in the preparation of pig compo; hence a decrease in the proportions of protein and fat and a corresponding increase in those of ash and phosphates. The addition of bone meal to foodstuffs is no doubt of value, particularly in the case of young growing animals, whose bony structures have yet to be built up; it is generally admitted, however, that only relatively small proportions of the insoluble tricalcium salts are acted upon by digestive fluids.

### PROBABLE FEEDING VALUE OF THESE MEALS.

It may be said at once that taken by themselves these meals are not fattening meals, and should not be used as such. From the feeding point of view they consist essentially of protein (primarily flesh forming material) and fat, whilst the carbohydrates (starches, &c.), the main producers of fat, are to all intents and purposes absent. It is, of course, true that edible fats and, in certain cases, even protein can fulfil the same purposes as the carbohydrates; but when the former are present in excess, as is the case in these meals, they lead to early satiety, and have moreover an injurious influence on the quality of the bacon. Clearly, therefore, these meals should never be used alone, but in a reasonable mixture with other foodstuffs rich in starchy materials. Moreover, they are likely to be particularly useful in those cases in

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which a nitrogenous diet is of special value, namely, for young growing pigs and for sows mothering their litters. It is questionable whether they can be recommended for the fattening of full grown pigs; hence, I decided that the feeding tests should be applied to young, growing pigs of 50lbs. to 60lbs. weight, and to sows on their litters.

Of the two meals "Pig Meal" has the higher feeding value, it corresponds to 85.5 starch equivalents, as against 81.1 for "Pig Compo." This means that 100lbs. of pig meal has a feeding value equivalent to that of 85.5lbs. of starch, and pig compo to that of 81.1lbs. This difference in value is reflected in their prices, which are respectively £19 and £18 5s. a ton; on the whole, at these prices, pig meal is the cheaper of the two, pig compo, irrespective of its phosphates, having a relative value of £18 0s. 6d. a ton only.

#### DETERMINATION OF SUITABLE RATIONS FOR YOUNG PIGS.

Since these meals could not be fed alone, it was necessary, in the first place, to determine suitable mixtures in which they could take part. In this connection the calculated average requirements of young pigs of various weights is shown below:—

	Live Weight of Pigs.		
	50lbs. lbs.	60lbs. lbs.	70lbs. lbs.
Dry matter . . . . .	2.20	2.64	3.08
Digestible protein . . . . .	0.33	0.40	0.46
Digestible fat . . . . .	0.05	0.06	0.07
Digestible carbohydrates and fibre . . . . .	1.40	1.68	1.96
Starch equivalent . . . . .	1.69	2.03	2.37

I decided that these meals should be fed in mixture with crushed six-row barley, as most suitable to our purposes. Roughly speaking, 2½lbs. of this barley per day would correspond to the average requirements of a 50lb. pig in the matter of starch equivalents. Its food ingredients would, moreover, be distributed as follows:—

	lbs.
Dry matter . . . . .	2.39
Digestible protein . . . . .	0.10
Digestible fat . . . . .	0.01
Digestible carbohydrates and fibre . . . . .	1.68
Starch equivalent . . . . .	1.65

Clearly, then, these 2½lbs. of barley represent a highly starchy food ration, markedly deficient in protein, and as such not at all adapted to the feeding requirements of young, growing animals. If on the other hand we substitute half a pound of one of these meals for three-quarters of a pound of barley, which is roughly its starch equivalent, we shall secure a food mixture which is theoretically far more satisfactory as the figures below will show:—

	2lbs. Barley.	½lb. Pig Meal.	Calculated Requirements of 50lb. Pig.	
	lbs.	lbs.	lbs.	lbs.
Dry matter . . . . .	1.73	0.46	2.19	2.20
Digestible protein . . . . .	0.08	0.26	0.34	0.33
Digestible fat . . . . .	0.01	0.17	0.18	0.05
Digestible carbohydrates and fibre . . . . .	1.22	—	1.22	1.40
Starch equivalent . . . . .	1.25	0.43	1.68	1.69

The composition of this mixture (2lbs. of barley and  $\frac{1}{2}$ lb. of pig meal) corresponds sufficiently closely to the calculated requirements of a 50lb. pig. There is, it is true, a deficiency in carbohydrates, but this is amply compensated by the high proportion of fats present.

The requirements of young pigs of heavier weights are shown below:—

	Barley. lbs.	Pig Meal. lbs.	Star Equivalent
50lb. pig . . . . .	2	$\frac{1}{2}$	1.56
60lb. pig . . . . .	2 $\frac{1}{2}$	$\frac{3}{8}$	2.03
70lb. pig . . . . .	3	$\frac{3}{8}$	2.24
80lb. pig . . . . .	3 $\frac{1}{2}$	$\frac{3}{8}$	2.53

#### DESCRIPTION OF TESTS WITH YOUNG PIGS.

Twelve young pigs were selected and divided up into three lots, A, B and C. Their mean weights on September 30th were as follows:—

	lbs.
Lot A . . . . .	53.75
Lot B . . . . .	69.00
Lot C . . . . .	75.00

It is to be regretted that a more even lot could not have been secured but this unfortunately was not possible at the time.

During the first fortnight these pigs were fed as follows:—

Lot A—2 $\frac{1}{2}$ lbs. of crushed barley per head per day.

Lot B—2lbs. of crushed barley and  $\frac{1}{2}$ lb. of pig meal per head per day.

Lot C—2lbs. of crushed barley and  $\frac{1}{2}$ lb. of pig compo per head per day.

During the course of the second fortnight the barley allowance was increased all round by  $\frac{1}{2}$ lb. per head per day, and lot A was supplied with pig meal, and lot B with pig compo, whilst lot C was fed with barley alone.

During the third fortnight lot A was supplied with pig compo and lot C with pig meal, whilst lot B was fed with barley alone; during this period the barley allowance was increased by  $\frac{1}{2}$ lb. in the first week, and by an additional  $\frac{1}{2}$ lb. in the second week.

Under the above arrangement each lot of four pigs was fed respectively for fortnightly periods with barley alone, barley and pig meal, and barley and pig compo. In this fashion any tendency on the part of individual pigs to favor one form of foodstuff more than another will have been effectively neutralised.

At the end of each fortnight the pigs were carefully weighed and the increases in weight noted are summarised below:—

#### Average Increase in Weight Per Head Per Day.

	Barley Alone. lbs.	Barley and Pig Meal. lbs.	Barley and Pig Comp. lbs.
Lot A . . . . .	0.42	1.76	1.36
Lot B . . . . .	1.26	0.77	1.42
Lot C . . . . .	1.04	1.37	0.77
Means . . . . .	0.91	1.30	1.18

The net result of these tests is that by substituting in the rations of young pigs  $\frac{1}{2}$ lb. of pig meal or  $\frac{1}{2}$ lb. of pig compo for three-quarters of barley, there has been a daily gain in live weight of 0.39lbs. and 0.27lbs. per head respectively.

#### FINANCIAL ASPECT OF THE TESTS.

At what cost have these increases in weight been secured, and what is their cash value? The cash value of  $\frac{1}{2}$ lb. of pig meal at £19 a ton is 1.02d., and that of  $\frac{1}{2}$ lb. pig compo at £18 5s. a ton is 0.98d. From each of these figures we shall have to subtract the cash value of  $\frac{1}{2}$ lb. of barley, for which the meals were in each instance substituted. If we assume Cape Barley to be worth 2s. 1d. a bushel,  $\frac{1}{2}$ lb. will have a value of 0.38d., and the cost of the pig meal and pig compo be reduced to 0.64d. and 0.60d. respectively.

Thus, then, the use of  $\frac{1}{2}$ lb. of pig meal and  $\frac{1}{2}$ lb. of pig compo per day have led to increases in live weight of 0.39lbs. and 0.27lbs. at a cost of 0.64d. and 0.60d. respectively, that is to say, at a cost of 1.64d. and 2.22d. per pound live weight respectively.

#### CONCLUSION.

Apart altogether from the fact that foodstuffs relatively rich in protein must of necessity be fed to young growing pigs, these tests show that the increases arising from the use of pig meal and pig compo are in every sense profit bearing. It is perfectly true, of course, that skim milk would probably supply their place equally well, and those who have an ample supply of skim milk will not find it necessary to secure additional foodstuffs rich in protein. Nevertheless, there are many pig breeders who are not in this happy position, and to them these meals, and particularly pig meal, can safely be recommended for the special purposes already indicated.

Additional tests for sows on their litters are now in hand, together with others for young pigs in conjunction with skim milk, and the results deriving from them will be made public as soon as they are available.

#### THE ADVANTAGES OF FEEDING CAPE BARLEY INSTEAD OF SELLING IT.

But apart from the particular tests we have had in view, do not the general results confirm my contention that barley is best marketed through livestock? In this particular instance 12 young pigs, averaging at the outset about 66lbs., were fed for six weeks on crushed barley and meat meal. Their total consumption during this period was represented by 31 $\frac{1}{2}$ bush. of barley, 84lbs. of pig meal, and 84lbs. of pig compo; and the total increase in live weight by 570lbs. Pigs of this type are worth at present about 80s. a piece, or about 8 $\frac{1}{2}$ d. a pound; we may therefore place the total value of the increase at £20 4s. The total cost of the meals, exclusive of carriage, is represented by 28s., which leaves £18 16s. as value received for 31 $\frac{1}{2}$ bush. of barley, or nearly 12s. a bushel. I admit that the calculation is crude, and the final result by no means a net figure; cost of handling the pigs and getting them to market has to be taken into consideration; but, when all is said and done, is not this better than selling Cape barley at 2s. a bushel?

## RESULTS OF EXPERIMENTAL PLANTING AT PARILLA FOREST.

[A Report prepared by WALTER GILL, F.L.S., Conservator of Forests.]

In September, 1907, a deputation of some of the leading residents in the Lameroo district waited on the then Hon. Commissioner of Forest Lands, Hon. L. O'Loughlin, and requested that an area might be dedicated for forest purposes in order to carry out experiments to ascertain whether timber could be grown to supply the future requirements of the settlers in the Pinnaroo district for posts, &c.

The circumstances generally prevailing in the greater bulk of the "mallee" country are very seldom such as to warrant the expectation that large timber can be grown there fit to supply the settlers' needs. But on inspecting the land available, sections 59 and 92, hundred of Parilla, the general indications appeared more favorable from some aspects than usual, as large native pines (*Callitris propinqua*) there had supplied numbers of posts, and, in isolated places which had escaped the frequently recurring fires, the common "mallee" (*Eucalyptus dumosa*) had attained large size, as the subsoil was clay instead of the limestone subsoil so constantly occurring in this State. Further examination showed that very slight traces of limestone could be found, the prevailing subsoil being clay. As regards the rainfall, the only details available were the records for Lameroo, from which it appeared reasonable to infer that 16in. or 17in. or thereabouts, might be expected as the land referred to was but a few miles from Lameroo.

After due consideration of these circumstances the Hon. Commissioner decided to comply with the request of the deputation, as it seemed very desirable, if possible, to make some effort to provide a supply of timber for the future wants of the residents in such an extensive area as the Pinnaroo district, where such an entire scarcity of suitable timber existed; but it was on the clear understanding that the operations could only be considered to be of an experimental nature. The work has now been carried on for about 11 years, but the results can hardly be said to have equalled even the moderate expectations which the first two or three seasons' work aroused. The first year in which the operations were started, 1908-9, appeared to bear out the view formed as to the quantity of rain to be expected, as a fair lot of rain fell, and the trees then planted had a fair start. During the next two years, of which no record is available owing to the pioneering state of the operations, the rains were also good; but in the fourth year a decided falling off was experienced, as the amount dropped to the extent of about 44 per cent., being only 11.02in., and for the next four years the amount that fell was much under the average anticipated, being only 10.68in. for the five years from 1911-1916, or about 10in. less for five years than was expected, as nearly 18in. fell in 1910-11, but that quantity was not again reached until 1917-18, immediately after which it fell again in 1918-19 to 8.99, and this year, 1919 to 1920.

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was not more than 9.26, as reference to the rain records of the last 10 years given below will show, thus making the average for 10 years only 12.69in.

The decrease in the rain was speedily felt by the trees, for, while in the year 1909-10 I was able to report that in 22 months sugar gums had grown well up to the usual average, the subsequent decrease in rain resulted in the greater number of the trees planted two years afterwards only attaining a height of 4ft. in eight years, or merely 6in. a year, though a few grew as high as 6ft. or 7ft. It is not, therefore, surprising, under these circumstances, to find that the only trees to grow to any size are those which enjoyed the first few good seasons, and they occupy only 25 acres or thereabouts, which is only 25 per cent. of the 100 acres planted. The species which grew best from a timber point of view were the sugar gums, with a few blue gums, while the Murray box (*Eucalyptus largiflorens*), though not developing satisfactorily from that standpoint, grew quite as well, but in a form more fitted for a shelter tree, its habit being more of a bushy nature.

All the gums which there was any chance of growing have been tried, and of those it is abundantly evident that the following cannot succeed against the testing conditions by which they are surrounded.

The box gum (*Eucalyptus hemiphloia*) only grows in a stunted scrubby form for the most part; and though occasionally a tree here and there makes a better stem, there is no possibility of its ever growing to the size necessary for providing posts or other timber suitable for farmers' requirements. The same may be said of the Yate gum of Western Australia (*Eucalyptus cornuta*), which struggles on in a shrubby form with no promise of timber growth. The spotted gum (*Eucalyptus maculata*), which, under fair conditions, grows fine poles of a very elastic character well adapted for rails, buggy poles, waggon shafts, &c., cannot develop against the hard frosts in the winter and the scanty rainfall usually experienced. The forest red gum of New South Wales (*Eucalyptus tereticornis*) has also quite failed to get beyond the shrubby stage. These can only be regarded as totally unsuccessful.

As regards the pines planted, the three kinds set out are the Canary Island (*Pinus canariensis*), Maritime (*Pinus maritima*), and the Aleppo (*Pinus halepensis*). The two first have proved total failures, as a very few are now alive. The last has been more successful, as larger numbers are alive and still hold on, but the growth is very slow indeed, and gives no promise of growing to anything approaching timber size. It can, however, be relied on to give good shelter if given the special attention that is possible in dealing with few trees around a homestead.

One of the earliest experiments undertaken was to see what could be done in the way of planting the sandhills, of which there are several strips on the reserve running in an east and west direction. An area of five acres was cleared of the existing mallee and planted with Aleppo pines (*Pinus halepensis*) and Maritime pines (*Pinus maritima*). It was soon found out that the action of the winds, occurring from time to time, was very trying to the young trees, as, in many cases, it blew most of the sand away from the roots, leaving them

exposed to the drying influence of the atmosphere, while in others it buried scores of the trees right over, some to such an extent as to leave only the tops just above the ground. After eight years there are now but an odd Maritime pine here and there, no higher than a foot or 18 in., and, though the Aleppo pines are more numerous, there are only one or two which are 3 ft. to 5 ft. high, the greater number being only 1 ft. to 2 ft. above ground, and only just struggling along.

It must be noted here that the mallee growing on the sandhills, viz., *Eucalyptus incrassata* and *Eucalyptus dumosa*, are much smaller in growth there than the same species on better soil on the lower levels; therefore it can hardly be expected that anything approaching useful timber size will grow on the sandhills, which in summer are like a hotbed for several feet down; and it seems sufficiently clear that they cannot be considered a suitable site for plantations for fencing and similar purposes, if the hardy native mallee only attains such puny dimensions.

As the sugar gums, like so many of the other gums, are strong light demanders, the practice has been followed of planting them at a greater distance apart, and interplanting them with other trees to shade the ground thus exposed, and at the same time keep up the head of the larger trees.

The sheoak generally known as Kingston sheoak (*Casuarina glauca*) has thus been interplanted, with a fair amount of success, and two other trees have also been tried in the same way, namely, the tamarisk (*Tamarix gallica*) and the white acacia (*Robinia pseudacacia*). While they have been employed in this way, they have at the same time shown their suitability for shelter and shade purposes, as they have stood the conditions there so far very well. The tamarisk is hardly likely to grow large enough for post timber, but it is a fair fodder tree, and when once a few were well established, it would be a fairly easy matter for anyone to grow large numbers, with a little care, from the cuttings they would produce; and in a time of drought they would be very serviceable, as camels, goats, sheep, and other stock generally eat the foliage of this tree with avidity. The white acacia may possibly grow large enough for round posts, which are largely used in America when obtained from this tree; but there always appears to be a prejudice against round posts in South Australia, so that but little would be gained even if sufficient size were obtained, as only split posts command any sale as a general rule.

The only tree now remaining to be considered is the salmon gum (*Eucalyptus salmonophloia*), which I have lately been able to introduce into this State, for the first time, in consequence of my visit to Western Australia about three years ago; and it is encouraging to find that it has given promise of succeeding well at Parilla, as 75 per cent. of the trees planted this last season are alive and thriving well. It is, of course, premature to form a decided opinion as yet; but the conditions under which it grows in Western Australia, from what I have been able personally to note, certainly give some basis for expecting good results.

The rainfall in the open park-like forest country near the goldfields Kalgoorlie, and other places, is only about 10in. per annum, in spite of which it grows to 60ft. to 80ft. high, sometimes more, with a trunk 30ft. to 40ft. high, and a diameter of 2ft. to 3ft. at breast high. Not only so, but it appears to stand a certain amount of saline matter in the soil, which is inimical to most other gums, and also does fairly well on limestone country. It is one of the strongest timbers in Western Australia, and it has mainly been used for mining timber hitherto, though it is reported to be suitable for fencing purposes. It is, however, very difficult to get seed, so that it can only be planted to a limited extent at present.

In conclusion, it may be stated that though good work has been done in demonstrating what are the most suitable trees for the Pinnaroo district "mallee" country for shelter and shade, it can hardly be considered that the main object of the work, which is production of timber for posts and other farming requirements, has been attained, and it is to be feared that with the rainfall averaging only about 12in. very little can be done in the direction desired.

*Rainfall Report, Parilla Forest Reserve.*

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910-11 . . . . .	1.53	1.29	2.88	1.05	1.48	.42
1911-12 . . . . .	.93	1.11	2.01	.12	2.16	—
1912-13 . . . . .	1.42	1.18	1.81	.69	1.43	.57
1913-14 . . . . .	.57	1.13	2.63	1.56	.91	.49
1914-15 . . . . .	.65	.06	.15	—	1.30	.73
1915-16 . . . . .	.56	2.29	2.39	1.41	.09	—
1916-17 . . . . .	2.56	3.14	2.61	.68	.92	—
1917-18 . . . . .	2.70	2.47	1.89	1.91	2.79	.71
1918-19 . . . . .	.74	1.94	—	1.31	.11	—
1919-20 . . . . .	.44	.97	2.47	.40	.43	.52

Year.	Jany.	Feb.	Mar.	April.	May.	June.	Total.
1910-11 . . . . .	1.56	3.58	.87	.22	1.00	2.04	17.92
1911-12 . . . . .	—	—	.33	.15	.28	3.93	11.02
1912-13 . . . . .	.04	1.48	3.01	1.25	.79	.03	13.80
1913-14 . . . . .	.16	.14	.79	.93	.46	.59	10.36
1914-15 . . . . .	.50	.11	—	.78	2.06	2.43	8.77
1915-16 . . . . .	.78	—	.35	.82	.38	3.84	12.91
1916-17 . . . . .	.30	.71	.50	.64	2.65	.65	15.36
1917-18 . . . . .	—	.44	.44	.90	2.56	1.77	18.53
1918-19 . . . . .	.12	2.13	—	.06	1.96	.62	8.99
1919-20 . . . . .	—	—	.42	.10	.90	2.61	9.26

126.97

Average for 10 years . . . . . 12.69

## FIFTH ANNUAL FARM COMPETITION, 1920, OF THE NARACOOORTE AND KYBYBOLITE BRANCHES OF THE AGRICULTURAL BUREAU.

Under the following Committee of Management:—Messrs. F. A. Holmes (Chairman), S. H. Schinckel, C. H. Hahn, J. Donoghue (Hon. Secretary), J. M. Wray (Naracoorte Branch), L. S. Davie, A. Bradley, S. Sheppard, C. Hahn, and H. B. Schinckel (Kybybolite Branch).

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

The farm competitions conducted by the Naracoorte and Kybybolite Branches of the Agricultural Bureau have been extended in this, the fifth consecutive year, to include livestock as well as farm management, crops, and gardens. The addition of classes covering (a) best herd of cows and (b) best flock of sheep on a farm is certainly a step forward, in a district which now carries many sheep, and which is essentially suited to dairying.

As the classes covering the working and management of farms are the most important ones in the competition, and as this is the first year of trial for the silver cups, which must be won twice by the same competitor before becoming his property, only this year's results can be considered in this report.

### BEST WORKED AND MANAGED FARM.

Two classes for farms have been arranged, and silver cups have been presented—(1) for farms over 750 acres, and (2) for farms under 750 acres. The committee of management arranged the following conditions and scale of points, and both of the above classes are judged by them:—

#### CONDITIONS.

1. All competitors for the P. and A. Society's cups must be members of the Naracoorte Pastoral and Agricultural Society.

2. The competition shall be open to all persons farming or residing within the radius of the boundaries of the district council of Naracoorte.

3. Entries in writing, and accompanied by necessary fee, must be lodged with the Hon. Secretary of Farm Competitions, Naracoorte, not later than Monday, October 4, 1920.

4. All entries to be made in the name or names of the *bona fide* owners of the property entered for competition.

5. The judging will take place about the middle of November, 1920, for all classes excepting sheep, which will be judged in the wool, as soon as possible after the entries close, and the decision of the judges shall be final.

6. Competitors will be required to accompany the judges and, if necessary, also drive them round the property entered for competition, and also to answer any questions bearing upon the same, which may be put to them by the judges.

7. Where share farmers compete, the person who does the work receives the prize.

8. The judging for the best worked and managed farms will be done by the point system from a commercial point of view, and to the following standard:—

- |   |     |
|---|-----|
| 1. System of cropping, including cultivation, rotations, manures, growing crops, summer crops, and fallow . . . . .                   | 100 |
| 2. Most profitable class of stock on the farm, advantage being given to breeders (horses, sheep, cattle, pigs, and poultry) . . . . . | 100 |
| 3. Implements and machinery suitable for the farm . . . . .   | 40  |

4. The general care of implements, harness, and farm equipment . . . . .	25
5. System of boundary and divisional fencing, including gates, sheep, horse, and cattle yards . . . . .	15
6. System of conveying surplus surface water from the farm land . . . . .	40
7. The provisions for fodders . . . . .	15
8. Watering stock and water supply . . . . .	40
9. Time and labor saving appliances and methods . . . . .	40
10. Arrangements of dwellings and outbuildings . . . . .	16
11. Plan and upkeep of orchard, vegetable, and flower gardens, and other plantings for beautifying the homestead . . . . .	25
12. Afforestation or shelter breaks . . . . .	20
13. Experimental work of any kind conducted . . . . .	30
14. Discretionary points allowed by judge . . . . .	15
Total . . . . .	550

## CLASS I.—BEST WORKED AND MANAGED FARM.

Area, 750 acres or over. Prize, silver cup, value 5 guineas (presented by L. DeGaris, Esq., through the Naracoorte P. and A. Society), to be competed for and won twice by the same competitor; each winner's name to be engraved on the cup.

Three farms were entered for competition in Class I, this year, as follows:—Mr. Geo. Kelly, Hynam; Mr. F. W. Rochow, Hynam; Mr. S. Sheppard, Kybybolite. The points allotted to the exhibitors, under the scale arranged by the committee, are shown together, and then discussed in some detail:—

	Pos. sible Points.	Points Awarded			
		S. Shep- pard, Kybybolite.	F. W. Rochow, Hynam.	Geo. Kelly, Hynam.	
1. System of cropping, including cultivation, rotations, manures, growing crops, summer crops, and fallow . . . . .	100	52	36	60	
2. Most profitable class of stock on the farm, advantage being given to breeders (horses, sheep, cattle, pigs, and poultry) . . . . .	100	86	63	60	
3. Implements and machinery suitable for the farm . . . . .	40	32	30	20	
4. The general care of implements, harness, and farm equipment . . . . .	25	23	20	10	
5. System of boundary and divisional fencing, including gates, sheep, horse, and cattle yards . . . . .	40	30	30	15	
6. System of conveying surplus surface water from the farm land . . . . .	15	7	—	4	
7. The provisions for fodder . . . . .	40	27	15	17	
8. Watering stock and water supply . . . . .	40	30	25	20	
9. Time and labor saving appliances and methods . . . . .	10	8	—	2	
10. Arrangements of dwellings and outbuildings . . . . .	25	15	15	10	
11. Plan and upkeep of orchard, vegetable and flower gardens, and other plantings for beautifying the homestead . . . . .	20	16	18	4	
12. Afforestation or shelter breaks . . . . .	30	15	10	5	
13. Experimental work of any kind conducted . . . . .	15	3	—	3	
14. Discretionary points allowed by judges . . . . .	50	30	20	—	
Totals . . . . .	550	374	282	230	

1. *System of Cropping*.—In the subdivision of the 100 points allowed under this heading, more points have been allotted to rotation of crops than for anything else, as being of more importance in a district with natural conditions, such as exist in the locality of Naracoorte. The judging was done on the following

Division:—Cultivation, 15; rotation, 25; manuring, 15; growing crops, 15; summer crops, 15; other forage crops, 15; and the points allotted each competitor are as follows:—

Subdivision of No. 1.	S. Sheppard, Kybybolite.	F. W. Rochow, Hynam.	Geo. Kelly, Hynam.	Possible Points.
(a) Cultivation . . . . .	9	7	12	15
(b) Rotation . . . . .	12	8	20	25
(c) Manuring . . . . .	11	7	9	15
(d) Growing crops . . . . .	8	10	9	15
(e) Summer crops . . . . .	—	4	10	15
(f) Other forage crops . . . . .	12	—	—	15
Total . . . . .	52	36	60	100

Although all competitors are crop growers, the marks allotted show that much improvement is possible in this direction. (b) The comparative shortness of the time that these holdings have been cultivated naturally means that fixed rotations of crops are unlikely to be practised, because much work has to be done towards cleaning up the land for crops. In this direction Mr. Kelly is the only competitor who practises a fixed rotation on his main cropping area, and although this system of bare fallow—wheat—pasture, is very probably not the best one for the district, it has the advantages of practically assuring good crops, providing grazing on one-third of the farm, and keeping up the fertility of the soil. Mr. Sheppard has been working most of his fields as wheat—oats—subterranean clover (for several years), but does not use this as a fixed rotation for his whole farm. Mr. Rochow appears to have no fixed rotation, but crops where convenient each year. (e) Of summer crops, Mr. Kelly is the only one who has made an effort to grow a fair area, and his crops of millet and rape are only wanting rain to make good crops. Mr. Rochow tried a little rape, but with far from the best success. (f) Mr. Sheppard has tackled the job of replacing the comparatively poor natural feed with something better, and much of his farm is now well covered with subterranean clover, and in consequence the stock-carrying capacity of his land has been very considerably increased.

2. *Livestock*.—All three competitors make sheep their main line of livestock, so more points are allowed for sheep than for the other kinds, and the 100 points allowed have been divided up as:—Horses, 15; sheep, 45; cattle, 25; pigs, 10; and poultry, 5. The sheep were judged, in the wool, by Mr. Donald McBain, who marked the various flocks as:—Mr. Sheppard, 90 per cent.; Mr. Kelly, 60 per cent.; and Mr. Rochow, 40 per cent.; which points are shown below with the others for livestock:—

Live Stock.	S. Sheppard, Kybybolite.	F. W. Rochow, Hynam.	Geo. Kelly, Hynam.	Possible Points.
Horses . . . . .	13	14	14	15
Sheep . . . . .	41	18	27	45
Cattle . . . . .	21	19	16	25
Pigs . . . . .	6	8	—	10
Poultry . . . . .	5	4	3	5
Total . . . . .	86	63	60	100

Mr. Sheppard's livestock are a very creditable collection, as is shown by the points allotted to them, and they are represented by really good types of animals (including poultry—fowls, ducks, and turkeys), well looked after and in good order. Other than the sheep, to which Mr. McBain could only give 40 per cent. of possible marks, Mr. Rochow's animals are good farm types, but hardly as well cared for as are Mr. Sheppard's, but he gains a little by being a breeder of pigs. Mr. Kelly is more a crop grower than a livestock farmer, and so naturally he does not show to advantage in this part of the competition.

3. *Suitability of Implements, &c.*—Mr. Sheppard has a full complement of implements and machines quite suitable for mixed farming operations and although Mr. Rochow's is not quite so complete, it is sufficient, and the implements are adapted for his conditions. Mr. Kelly's collection is rather scanty for anything but cereal growing.

4. *Care of Implements, Harness, &c.*—Both Mr. Sheppard and Mr. Rochow give their farm equipment reasonable care and protection, particularly so with the former, who keeps his poultry away from the machines, as well as providing care and repairing them as breakages occur. Mr. Kelly loses heavily here, as but little attention is given to much of his farm plant.

5. *Fencing, &c.*—Mr. Sheppard has good fences, and keeps them in really good order; they consist mainly of fences with one driven iron dropper between good solid wooden posts, with five plain wires and one barb, the remainder having only five wires, but provision has been made for another wire, and the soil is kept well mounded up to the bottom of these fences. Mr. Rochow also has good fences in good order, consisting of solid wooden posts, carrying five plain and one barb wire. Mr. Kelly has about two miles of netting on his boundary fence, making most of it rabbit-proof, but most of his subdivisional fences are only fair, with three plain wires and one barb, and many droppers yet to be put in place. As is to be expected on holdings which have not been farmed for long, stockyards are not as plentiful now nor as convenient as they should and will be, but in all cases, where present, the gates used are of good types.

6. *System of Surface Drainage.*—But little has been done by any of the competitors in removing surplus surface water by drainage, and this year's crops showed many evidences of the need of more being done in this direction.

7. *Provision of Fodders.*—For mixed farms, carrying and breeding large numbers of livestock, not enough conservation of fodder is practised. Mr. Sheppard makes cereal hay, saves and stacks straw, and does not overstock, and so his fields are well covered with fairly good feed, but his reserve of stored fodder is low. Mr. Rochow does not overstock, but his dry feed is not good, as so much of it is "winter grass," and at present he has no reserve supply of hay or straw. Mr. Kelly has some straw stacks, but no hay, and does not make a practice of leaving stacks of hay, but sells as soon as he considers his crops are assured, and safeguards his livestock to some extent by growing summer fodders.

8. *Watering Stock and Water Supply.*—Mr. Sheppard has paid more attention to reticulation of water around his homestead and for livestock than either of the other competitors, but in all cases better results would be secured from stock with more watering places.

9. *Time and Labor-saving Appliances.*—Home-made helps, which this heading intended to cover, are only present in any number on Mr. Sheppard's farm, among the most important of which are:—(1) Poison cart of original design, (2) chaff bagging box, (3) lever attachment for ploughs, (4) tools. Mr. Rochow shows nothing which can be included here, and Mr. Kelly only a couple of small items, such as the placing of fowl nests to keep the birds out of the horse mangers.

10. *Arrangement of Buildings.*—Both Mr. Sheppard and Mr. Rochow have fairly extensive farm buildings, arranged fairly conveniently as regards dwellings and working of their respective farms. Mr. Kelly's buildings are very scanty for a mixed farm.

11. *Orchard and Garden.*—Both Mr. Sheppard and Mr. Rochow have good farm gardens, but more care and attention is given by the latter to the upkeep of his garden. Mr. Kelly's garden is small, and rather neglected.

12. *Breakwinds and Afforestation.*—Mr. Sheppard has homestead, poultry yards, and farmstead fairly well protected, and plants some pine trees every year for shelter. Mr. Rochow has his homestead protected. Mr. Kelly has done but little planting.

13. *Experimental Work.*—Practically no experimental work is conducted by any of the competitors, but both Mr. Sheppard and Mr. Kelly do try on a small scale fodder plants new to them.

14. *Discretionary Points for Judge.*—The committee of management have allowed the judge 50 points for anything not covered by the subdivisions shown above, and in this connection 30 points were allotted to Mr. Sheppard for:—(1) The good methods and marked success in cleaning up his land. (2) The good work done in establishing a good fodder (subterranean clover) in place of the poor fodders of the district. (3) The improvement in storing his dry fodder (hay) by chaffing it into a shed, instead of stacking it. Mr. Rochow received his points for the general tidiness of his whole holding and for following essentially mixed farming practices by crop growing, dairying (milking nine cows), and breeding sheep, cattle, pigs, and horses.

*General.*—In allotting points to the various competitors, keeping in view condition No. 8, i.e., from a commercial point of view, no difficulty was experienced this year, as the value of the land, when cleared of natural growth, is about equal for each farm, when carting distance is taken into consideration. Mr. Sheppard is to be congratulated on the condition of his holding, and on the methods followed. In this connection the points he has received speak for themselves, for it is a most creditable performance to obtain 68 per cent. of the total marks, so split up by the committee of management as to cover essentially "mixed" farming methods, on a farm which has only been worked as such for a short period of time, and which is situated in a district where much of the land is not easily brought into farming condition. Further, receiving 86 per cent. of the total marks allowed for farm livestock, is an indication of the good quality and care shown with his animals, all kinds of which are very much above the average farm types. By "improving" (a) both the type and care given to his livestock (b) crops grown, (c) pastures, Mr. Rochow would increase his returns considerably, and would make his farm a hard one to beat in such a competition. The farm owned by Mr. Kelly, hardly improved enough yet to compete with such farms as the other two exhibited, but with more subdivision, grazing crops, &c., and better livestock, could easily be brought into the running.

#### CLASS II.—BEST WORKED AND MANAGED FARM.

Area, under 750 acres. Prizes, silver cup, value 5 guineas (presented by L. McGaric, Esq., through the Naracoorte P. and A. Society) to be competed for and won twice by the same competitor, each winner's name to be engraved on the cup.

In this class there was but one entry, that of Mr. M. J. Malone, of Naracoorte, and his farm has been judged by the same standard of points as for Class I., as arranged by the Committee of Management, with the following result:—

	Possible Points.	Points Awarded.
1. System of cropping . . . . .	100	23
2. Livestock . . . . .	100	56
3. Suitability of implements, &c. . . . .	40	5
4. Care of Implements, Harness, &c. . . . .	25	—
5. Fencing, &c. . . . .	40	10
6. Surface drainage . . . . .	15	—
7. Provision of fodders . . . . .	40	5
8. Water supply . . . . .	40	10
9. Labor-saving appliances . . . . .	10	—
10. Arrangement of buildings . . . . .	25	5
11. Orchard and garden . . . . .	20	5
12. Breakwinds and afforestation . . . . .	30	5
13. Experimental work . . . . .	15	—
14. Discretionary points for judge . . . . .	50	—
Totals . . . . .	550	124

Mr. Donald McBain judged the flock of sheep belonging to Mr. Malone, and marked them at 90 per cent. of the total allowed to this class of livestock. As the total points (124 out of 550) show, this was by no means a good exhibit.

#### CLASS III.—BEST GROWING CROP OF WHEAT.

Area, one-fifth of total area of wheat sown on farm, or not less than 25 acres. From a farmer's point of view, the main consideration in wheat growing is to produce crops returning the greatest amount of grain per acre, and to get the full market price for the grain when harvested, and in judging wheat crops these requirements must have first place. On this plan the apparent yield will be the most important subdivision, and must carry the most of the points to be allotted, and as diseases are the main cause of decreased prices, freedom from them will



be next in order of importance, and added to these subdivisions must be others showing trueness to type and freedom from weeds. Unfortunately, owing to the peculiarities of the season, the wheat crops of the district are, on the average, not good, and in consequence only five crops were exhibited, and these were judged as follows:—

Name and Address.	Variety.	Appar- ent Yield.	Freedom from Diseases.	True- ness to Type.	Freedom from Weeds.	Stand- ing
		60	20	10	10	100
W. Pyecroft, Morambro . . . .	Federation . . . .	52	18	7	6	83
C. A. L. Schinckel, Naracoorte . . . .	Yandilla King . . . .	40	18	7	6	71
G. Kelly, Hynam . . . . .	Federation . . . .	31	18	7	7	62
E. C. H. Schinckel, Kybybolite . . . .	Federation . . . .	29	18	9	7	63
P. J. Edwards, Hynam . . . . .	Major Federa- tion . . . . .	29	18	8	7	62

With one exception, the wheat crops exhibited were not good, most of them being very irregular and weedy, the patchiness, very probably, being due to the "wet" winter followed by a "dry" spring; but the weediness is certainly due to faulty soil preparation. All exhibits were fairly free from bad diseases, but loose smut, flag smut, or take-all were present to some extent in every crop shown. From the seed-wheat point of view the crops were fairly free from admixture of other wheats, and in this connection Mr. E. C. H. Schinckel's crop of Federation was nearest to the ideal. All crops were dirty with weeds, such as thistles, barley, wild oats, drake, or silver grass, most of which are controlled by proper cultivation, and their presence is a sure indication that good tillage methods have not been adopted. The same weaknesses in the growing of wheat, as were pointed out last year in the report of these competitions, are in evidence all over the district, and it appears quite certain that consistently good wheat crops will not be grown until these are corrected by:—

1. Much improved methods of cultivation.
2. Increasing the manuring to at least 1cwt. superphosphate per acre.
3. Using good graded seed true to type.
4. Trying other varieties of wheats. In many parts of the district Queen Fan, White Tuscan, or White Essex would be an improvement on Federation.

#### CLASS IV.—BEST GROWING CROP OF OATS.

Area, one-fifth of total area of oats sown on the farm, or not less than 25 acres.

Oat crops, from a grower's point of view, must produce heavy yields of grain or hay, and stand up well enough to be harvested without a great deal of trouble, and from the buyer's viewpoint must be free from bad weeds and diseases, and so the judging of these crops has been done on these lines, giving most points to the more important subdivision of probable yield. The five exhibits submitted have been marked as follows:—

Name and Address.	Variety.	Appar- ent Yield.	Freedom from Diseases.	True- ness to Type.	Freedom from Weeds.	Stand- ing
		60	10	10	10	100
C. A. L. Schinckel, Naracoorte . .	Algerian	50	8	10	8	73
P. J. Edwards, Hynam . . . .	Algerian	29	9	10	8	66
W. Pyecroft, Morambo . . . .	Algerian	32	7	9	8	65
P. A. Laurie, Kybybolite . . . .	Algerian	26	8	10	8	62
A. H. Bradley, Kybybolite . . . .	Algerian	26	8	10	8	62

This year there was only one good crop of oats amongst the five exhibited, that of Mr. C. A. L. Schinckel, which was a really heavy crop, fairly free from weeds and diseases, but which had lodged in many patches. Other than this crop, Mr. W. Pyecroft's was quite a fair one, but very weedy, and Mr. Edwards' crop

Although not heavy, was very clean. The crops on the whole were fairly free from weeds, particularly barley, which is a trouble in most parts of the State, but some little of this was present with drake, wheat, and canary grass.

It still appears that the recommendations made last year as likely to improve the oat crops of the district hold good, i.e.:—

1. The crops should not be grazed off by livestock so late in the season.
2. The crops should receive at least 1cwt. superphosphate per acre.
3. Good, clean seed should be used, being quite sure that it is free from drake and barley.
4. At least 2bush. of seed per acre should be used to help to keep weeds in check.

#### CLASS V.—BEST HERD OF COWS.

All on the farm to be shown, but not less than five. Preference to breeders. Prize, cup or trophy. To be won twice by the same competitor. Each winner's name to be engraved on the trophy.

The addition of a competition for the best herd of cows is a wise move by the committee of management, as at present it appears quite certain that the district will eventually be an important dairying centre, and the encouragement of good herds at the present time must play a very useful part towards high returns in the future. As milk production is the object in keeping cows, most of the points have been allotted to this part of the herd, and as the judging was not done on records, the 70 points for this was divided into 50 for appearance for milk, and 20 for care of animals; the remaining 30 points were allotted for size of herd, suitability of type to district, and purity of breed. The result of the judging is as follows:—

Name and Address.	Breed.	No. of Cows.	Appearance of Milk.	Care of Cows.	Suitability of Type.	Purity of Breed.	Size of Herd.	Total
			50	20	10	10	10	100
J. M. Wray, Hynam . . .	Jersey	7	48	20	9	8	6	91
A. Longmore, Hynam . .	Jersey	6	42	18	9	10	5	84
I. A. Kluge, Hynam . . .	Jersey	5	45	15	8	10	4	82
S. Sheppard, Kybybolite	Crossbred	7	42	20	7	—	6	75
D. Stuart, Naracoorte . .	Crossbred	14	42	14	8	—	10	74
E. Drake, Naracoorte . .	Grade Jersey	5	40	10	8	7	4	69

Mr. Wray's herd is a great credit to him, consisting as it does of two pedigreed cows, three at least fifteen-sixteenths, and two about seven-eighths Jerseys, all of good type, with every appearance of being heavy milkers, and showing that they have been extremely well cared for during the whole year.

Mr. Longmore's Jersey herd is quite nice, but although more pure bred than No. 1, the animals do not promise so much milk, and have not such "bloom."

Mr. Kluge has really good cows, but some are quite old, and they have every appearance of having been more or less neglected during the winter.

Mr. Sheppard's herd of crossbred cows is quite a good farm herd, and shows every sign of being well looked after, but it is very doubtful if big-framed types are as suitable as those of smaller size for a district with natural pastures of so poor quality.

The cows belonging to Mr. Stuart, which are crossbreds of good type, have suffered rather badly through the winter period, and had barely recovered from the setback at the time of judging.

Mr. Drake has three Jerseys and two grade Jerseys, but they suffered so badly from want of attention recently that they were not exhibited to the best advantage.

## GENERAL RECOMMENDATIONS.

In reporting on the farm competitions last year, I gave some impressions gained in going over the farms of the district of possible improvements in the farming practices, and mentioned:—

1. The scarcity of pigs.
2. The advantages of dairying.
3. The need of good rotation of crops.
4. Heavier manuring of crops to improve the stock-carrying capacity of the pastures in years following.
5. Correcting excessive acidity by applications of lime.
6. Drainage of surplus surface water.
7. The overstocking of pastures.
8. The excessive feeding off of crops.
9. Extending the areas under peas.

All of the above still appear to me as recommendations worth thinking about, as again this year there are ample evidences of the need of some such improvements.

This year's tour of the district brings to mind a few other recommendations which would very probably be helpful in increasing returns, without necessarily involving any change in the system in vogue of working the farms.

*Improving Pastures.*—On most farms of the district a fair amount of cropping is done, but in the majority of cases a lot of livestock are carried. Unfortunately, when the land is cleaned up and cropped silver grass becomes the common plant in the pastures, and as this is such an extremely poor fodder plant it appears to me that one of the important jobs of farmers carrying livestock is to replace this poor grass by a good forage plant as soon as possible. That this is possible, without much expense or much work, has already been proved by some of the farmers of the district, and it has been done by sowing about 1 lb. of subterranean clover seed to the acre with a cereal crop, and carefully nursing the pasture of the next year by not overstocking it. In the second year, or at the most the third one, this good fodder plant has established itself all over the fields in which sown, to the exclusion of poorer fodder plants, and the total grazing capacity, as well as the fattening powers of the pastures, has been very considerably increased.

*Subdivision of Holdings.*—It is one of the rudiments of livestock grazing that maximum results can only be obtained from pastures or crops to be grazed when fields are small, and the tendency of the farms of the district is, at present, certainly not towards subdividing into small fields.

*Summer Crops.*—The climatic conditions of the district are certainly fairly favorable to the growth of summer crops, and small areas are annually grown by quite a number of farmers, but not as successfully as might be. It has been proved in most temperate countries in the world, where summer crops are grown without irrigation, that with the exception of a few specially favored spots full results can only be secured when these crops are grown in rows, and the land between the rows kept well cultivated throughout the period of growth of the crop.

The most promising summer crop for forage, particularly for large stock, that I know of, for conditions such as obtain in this district, is the sunflower, sown at the rate of 5 lbs. seed per acre in rows about 3 ft. apart, and kept well cultivated as long as there is room between the rows for a horse to work.

*Cultivation.*—The majority of the crops of the district show, by the weeds present, the need of much better cultivation than is now given. Not only will cleaner crops result, but increased growth, and heavier grain yields, if the land receives more and better cultivation.

*Varieties of Crops.*—There is a large assortment of varieties of cereals, but in this district Algerian is practically the only variety of oat grown, and only a poor collection of wheats, far and away the most important being Federation. Of oats, very possibly Burt's Early or Bathurst No. 1 (if obtainable) would prove very useful in these conditions, and of wheats, Queen Fan, White Tuscan, and White Essex would very likely be a marked improvement on Federation.

## TO MAKE OLIVE OIL AT HOME.

[By C. H. BEAUMONT, Orchard Instructor.]

Many people have a few olive trees. The quantity of fruit from them may not be considered enough to gather for the purpose of selling; they may, however, be of sufficient weight to make a supply of olive oil for home use. The process is a very simple one, and the appliances required may be found in most homes, with the exception of the crusher, and even that machine is often used by owners of fowls, for crushing dry bones for food for their fowls.

The olives should be ripe or nearly so; those which drop to the ground are not to be wasted. The olives need not be picked separately from the fruit, but be stripped, either into a bag tied round the waist, or into bags spread on the ground. The fruit may be kept spread out thinly for one or two weeks to wilt, or it may be at once crushed. Several machines in general use will do for crushing olives. The machine for crushing dry bone, or that for crushing corn, will do; in fact, any machine that is strong enough to break up the seed of the olive will be efficient. For such a small plant about 10lbs. of olives at a time will be the quantity to use. Collect the crushed mass in a bowl or half-kerosine tin. It looks like a lot of wet linseed meal.

To get the oil it is necessary to have a number of pieces of canvas of the quality of a good sugar bag, and of the size of a 70lb. bag. Lay a quantity of the crushed fruit in the centre of the canvas, about 1 in. thick, and over about one-third of the surface. Fold the sides over, then turn the ends over, and the mass is enclosed in the canvas, and is ready for the press. Seven or eight of such lots may be made ready, and can all be pressed at once. A press must be something with a solid foundation, and which can be worked up to a good pressure. A screw press will be best, but a press may be made by placing a good tray of a kerosine tin cut long ways on top of a strong table on a flat log. Build the mats of the crushed fruit into the tray, being careful to have them level and even; put a clean board over the fruit mats. A lever must be made of a piece of timber or a sapling, say, 7ft. long and about 4in. by 3in. One end of the lever must be fastened down to a tree or post, or be inserted into a hole in the wall. It will then be laid across the mats of fruit, and a gentle pressure exerted at the far end will cause the oil and water to come through. The pressure will be increased until the mats are almost dry.

The oil and black water are to be drained from the tray by a hole in the edge of the tray, from which it will run into basins or, preferably, into glass preserving jars, so that further operations may be watched easily. The dried pulp is taken from the mats and mixed with hot water, enough to make it of the same consistency as it was before pressing; it is again put into the mats and again pressed. The operation may be repeated at least three times. On examining the jars, the oil will be found on the top of the fruit juice and the added water, which

is a nearly black color, and is referred to as black water. The oil may be decanted, but it is easier to syphon off the black water by using a length of rubber tube with a short length of glass tube in the end. By this means it is easy to separate the oil from the black water, and this operation must be done as soon as possible after pressing; if left very long, the oil will take up the bitter flavor of the black water. The crude oil must now be filtered; perhaps twice, or maybe three times, to get it quite clear and bright.

A filter may be made of half a jam tin or similar vessel, by punching a number of small holes through the bottom with a nail; then lay carefully in the tin about lin. thick of cotton waste, which has been well teased out, or silk waste is better, but is more costly. Fix this filter over a basin and pour in the crude oil slowly. Filtering is the slowest part of the process, and several filters may be worked at one time. If some black water has come through with the oil, it must be separated by decanting. When the oil is clear it is ready for bottling. The bottles must be clean, and they must be dry before pouring the oil into them. Oil keeps better if stored away from the light.

For larger quantities of fruit the operation is the same, but special machinery is, of course, required. Different manufacturers use varying plants, especially for filtering quantities. Some bottle direct from the filter; others prefer to mature the oil before bottling.

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## METHODS OF FEEDING SHEEP DURING PERIODS OF TEMPORARY SHORTAGE OF GRAZING.

[By W. J. SPAFFORD, Superintendent Experimental Work, and  
E. A. BRISTOW, Manager Booborowie Experimental Farm.]

(The notes which follow on appliances for hand-feeding sheep in the field are in reply to a special request from the Gawler River Branch of the Agricultural Bureau that some such tests should be undertaken by the department.—A.J.P.)

During this season a number of sheep-feeding trials were conducted at Booborowie Experimental Farm, extending over some months, and for part of the time with more than a thousand head of sheep.

### OBJECTS OF THE TESTS.

The tests had as their object the proving of inexpensive and simple methods of feeding sheep for short periods of time, during the temporary shortage of grazing which comes on practically all farms which are fully stocked, during some part of most years.

### REQUIREMENTS OF FEEDING METHODS.

The requirements of a feeding method depend, for any particular kind of livestock, on the class of feed available, and as the usual reserve fodders on South Australian farms consist of hay (to be fed when chaffed), cocky chaff, and cereal grain, the method of feeding must be suitable for chaff and grain.

Having decided that the feeders for sheep are to be used for chaff, grain, or a mixture of the two, the main points to be considered in connection with them will be as follows:—

(a) *Prevention of Waste.*—At the time of the year when sheep-feeding on farms is usually necessary—late autumn and early winter—we are liable to get much wind, and possibly a fair amount of rain, and to obviate losses of feed from these causes, the feeders must be such that wind does not easily blow chaff out, and that water is not held too well.

(b) *Prevention of Fouling.*—When opportunity is offered, sheep have a tendency to foul fodder supplied to them, by tramping on it, and with their droppings, and so a really effective method of feeding them must reduce the liability of the feed being fouled to a minimum.

(c) *Giving all Sheep a Chance to Readily get at Feed.*—Much of the advantage of feeding sheep over a period of shortage is lost unless all of the animals have easy access to the feed supplied, for if they are permitted to crowd at the feeders the stronger ones not only get most of the feed, but considerably knock the weaker ones

about—the reverse of what should be, as the weaker ones need the extra feed the most.

(d) *Convenience of Distributing Feed.*—The feeders must of necessity be such that the feed can be supplied with the minimum of trouble.

(e) *Convenience of Changing Feeding Ground.*—The best will not be got out of the sheep-feeding unless the feeding ground is easily changed from time to time, so that the droppings of the animals are distributed over the field rather than all collected in one spot.

(f) *Cheapness.*—The quality, and so the cost of any sheep-feeding apparatus, for this short-period feeding, will vary with the farm, and will depend largely on whether the receptacles can be properly stored and protected between the feeding times, but as most farms in this State have not good storage facilities for such things, the feeder most wanted is one sufficiently cheap so that it can be scrapped when the short feeding period is over.

#### METHODS OF FEEDING TRIED.

Keeping in view the requirements of the special conditions of our farms at present, as set out above, the methods tried were as follows:—

##### (A) DRY GRAIN.

Dry grain can be handled in a different manner from that which is necessary for chaff, because it is not liable to be blown about by wind, and because of the small bulk of a day's feed, it can be placed where it is exposed to winds, &c., and if receptacles are used, they need but relatively small holding capacity.

(1) *Spreading Dry Grain on Surface of the Ground.*—The common practice, as carried out by many sheep-feeders, of spreading the whole grain on the surface of the ground, was tried. This method fulfils some of the requirements well, in that (c) all sheep have an equal chance of getting at the feed, provided that it is thinly spread on the ground, (d) it is very easily distributed, (e) the feeding ground is easily changed, and (f) no appliances, other than conveyances to cart the feed, which are necessary for any method of feeding, are required, and so it is the cheapest way to supply a given weight of grain. Against these advantages it was found that the two main requirements—(a) prevention of waste, and (b) prevention of fouling, were by no means carried out, and much of the feed was wasted by the livestock; and, in fact, the wastage was a good deal greater than was noticeable at the time of feeding, for when sufficient rain had fallen to germinate cereals, the grain which had been trampled into the ground came up and formed mats of plants at the feeding-places. Further, with this method of feeding it is quite essential that the grain be fed whole, and it is generally

recognised that for livestock to make the most of grain it should be crushed before being fed to them.

(2) *Feeding Dry Grain in Wooden Troughs.*—The feeding of dry grain to sheep, in V-shaped wooden troughs, proved a very good method of supplying this class of fodder, with the exceptions that, (b) there was some fouling of feed due to the sheep standing in the troughs, and (f) the troughs are expensive, and as such must be stored and protected for about nine to ten months each year, needing much shed space, as one foot of trough is only sufficient—when sheep can get at both sides—to feed two sheep, meaning that if 600 sheep are being fed, 30 10ft. troughs must be stored under cover for most of the time.

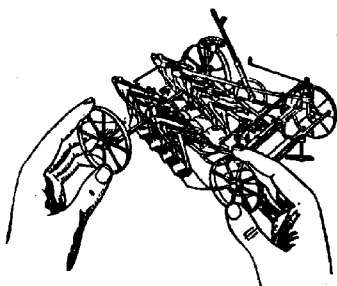
(3) *Feeding Dry Grain in Bag Troughs.*—Grain was also fed to sheep in simple troughs made by supporting old superphosphate bags on a framework of timber and fencing-wire, as shown in Figure 1. Such a trough, when one foot in length is allowed for every two sheep, fulfils all of the requirements set out above, except, *i.e.*, it is not a convenient method for changing the feeding-ground; but other than this, (a) there is practically no waste, (b) the feed is not fouled by the animals, as they do not like standing in such a trough, (d) feed is easily distributed, and (f) it is a very cheap trough to erect, costing no more than 8d. per foot, everything allowed for.

#### (B) CHAFF OR MIXTURE OF CHAFF AND GRAIN.

The difficulties met with in the feeding of chaff to sheep are mainly those of bulkiness, liability to be blown about by wind, and the long time which it takes sheep to eat their daily allowance, and so the comparatively long time for which it is exposed to wind, risk of fouling, &c. This being so, the main consideration in feeding it is the control of waste and fouling, and as the spreading of chaff on the surface of the ground is quite out of the question, this material must be fed in receptacles of some kind, and further, as all the sheep must have an equal chance of getting at the feed at the one time, long, narrow receptacles or troughs are the only reasonable ones to use.

1. *Feeding Chaff in Wooden Troughs.*—Wooden troughs, 10ft. long and V-shaped, made by nailing two 8in. by 1in. boards together, with rectangular boards about 16in. by 12in. for ends, were tried as feeders for chaff, but were not continued long in use, because although they admit of (d) easy distribution of feed, and (e) allow of easy changing of feeding-ground, they need much storage space (as was pointed out under "Dry Grain"), are very wasteful of feed (as even comparatively light winds blow much chaff out of them), lead to the fouling of feed (as because of their rigidity sheep can stand in them without discomfort), and they are fairly expensive to provide.





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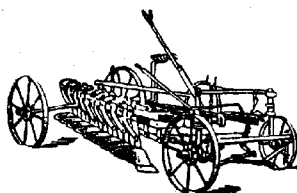
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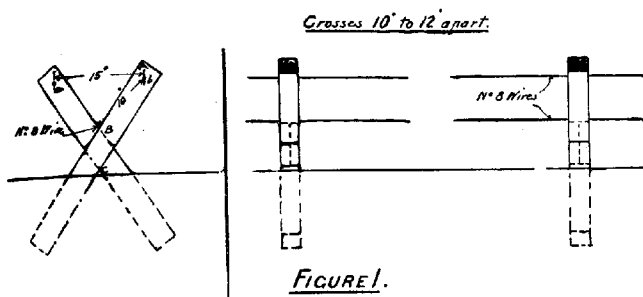
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**NORTH TERRACE, ADELAIDE.**

2. *Feeding Chaff in Bag Troughs.*—Trials were made in feeding sheep from various kinds of bag troughs, but as some of these were only modifications of one of two types, they can be dealt with under two headings.

FRAMEWORK TO CARRY BAGS FOR FEEDING TROUGH.



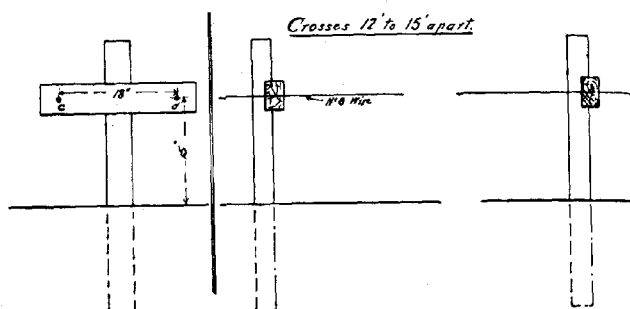
TROUGHS WITH BAGS FIXED LENGTHWAYS.

Bag troughs were made by constructing diagonal crosses of old timbers about 32in. long by about 4in. or 3in., so that at the top end of the cross the junction of the timbers comes about 12in. from the ends (A to B, Fig. 1). Holes sufficiently large to easily take No. 8 fencing-wire are then bored in the centres of the timbers about 2in. from top (A and B, Fig. 1). These crosses are then let into the ground about 10ft. to 12ft. apart, and so that the junction of the timbers at the bottom is almost down to the surface of the ground (C, Fig. 1). When sufficient crosses for the required length of trough are erected, a stub is put into the ground 4ft. or 5ft. from each of the end crosses, in the same line as the crosses, to take strut wires. No. 8 fencing-wires are threaded through the holes bored in crosses (A and B, Fig. 1) and strained until tight. On these strained wires, superphosphate bags which have been sewn together end to end (bottom of one to top of next), are fastened, and then a third No. 8 wire is put inside the trough, so that it rests on the bottom of trough and in the fork of each cross (B, Fig. 1), and is tightened up and tied to the stub at each end of trough.

Troughs made as above, when 1ft. of trough was allowed to every two sheep, gave great satisfaction as a method of feeding chaff to sheep on all requirements as already enumerated, except for the difficulty of changing the feeding-ground. Very little waste of feed occurred, as the trough gives with the wind, and but little is blown out. The feed is not fouled, because the looseness of the bag, and the presence of the wire in the bottom of the trough, makes it difficult for the sheep to stand in it for any length of time. Being an open trough, it is easy to distribute the feed, and the whole thing is constructed cheaply.

**MODIFICATION OF TROUGH AT FIGURE 1.**

A slight modification to the above trough was made by the addition of two extra wires placed half-way between the top wires and the bottom one. This five-wire trough has an advantage in that it gives rigidity to the trough, and so saves the bags from wearing out so quickly in windy years, but as the bags in the three-wire trough will easily last out a feeding season, with a little attention once or twice during the time, the extra cost of erection and wire is not worth while.

**FRAMEWORK TO CARRY BAGS FOR FEEDING TROUGH.****FIGURE 2.****TROUGHS WITH BAGS FIXED SIDEWAYS.**

Another type of trough was made by constructing vertical crosses from rough timbers, with crossbar about 2ft. long, and fixing them in the ground so that the centre of crossbar was 15in. above the ground level. Two holes large enough to take No. 8 fencing-wire easily were bored in the crossbars 18in. apart (C and D, Fig. 2), and the crosses erected about 12ft. to 15ft. apart. Stubs were put in at the ends of the line of crosses, and the end ones strutted to these stubs with wires, then a No. 8 fencing-wire was run through each line of holes, and strained up. Bags sewn together down their side seams were then fastened to the two strained wires, to make a loose hanging-trough about 12in. deep and 18in. wide.

This trough proved quite an effective receptacle from which to feed sheep, from all points of view, except ease of changing feeding-ground, but proved unnecessarily large for the work to be done, and consequently many more bags were used than were necessary. Careful observation during these feeding trials showed that it was essential to provide 6in. of trough for every sheep, if all of them were to get their proper share of the feed supplied, and so the size of the trough must be such that 6in. of length will hold enough feed for a sheep for one day. Added to this, it was also found that if the trough is quite full, the wind plays on the feed and the loss is fairly

great, so that the trough must be sufficiently large to hold a day's supply, and still be only about three-quarters full. The trough on the framework shown in Fig. 1, which is roughly triangular, and 15in. wide by about 9in. deep, is quite large enough to properly hold a day's feed for one sheep to every 6in. of length, and so the more or less semicircular trough 18in. wide and about 12in. deep is much on the big side.

#### MODIFICATIONS OF TROUGH AT FIGURE 2.

The addition of a No. 8 wire at the bottom and on the inside of this trough added to its stability, and helped to preserve the bags, but naturally did nothing to overcome the excessive largeness of the trough.

Another modification of the hanging-trough was tried, by shaping old 30in. wire-netting, and putting it outside the bagging. This was not done with the idea of making a more effective trough for short-period feeding, but rather to make a suitable trough with a comparatively long life, and it proved quite effective for the purpose, as the netting protected the bagging so well that it was hardly damaged at all during four months of continuous feeding, and the presence of the netting did not counteract the advantages that the bag trough has over a more rigid kind.

#### COST OF TROUGHS.

Taking 20ft. as a unit of length of the trough tried, the costs worked out as follows:—

1. A pair of V-shaped *wooden troughs*, made from jarrah boards 10ft. long by 8in. by 1in., will cost almost exactly 30s. for the 20ft.

2. A 20ft. length of a *three-wire bag trough on diagonal crosses*, costs, at present, 17s. 9d., as follows:—Timber, 4s.; wire, 1s. 9d.; labor, 10s.; bags, 2s. (8 at 3d.).

3. A 20ft. length of a *two-wire bag trough on vertical crosses*, costs, at present, 17s. 5d., as follows:—Timber, 3s.; wire, 1s. 2d.; labor, 10s.; bags, 3s. 3d. (13 at 3d.).

That these figures will be considerably reduced for longer troughs is only reasonable, and it proved so here, where a 150ft. length of a three-wire trough on diagonal crosses actually cost £4 18s. to erect, which equals 13s. 1d. per 20ft. length, as against 17s. 9d. for a single 20ft. trough of the same kind.

These figures are first costs, and as the crosses and wires can be easily stored from year to year, for some time the annual cost will only be labor for dismantling and erection, and a new supply of bags.

#### THE SHEEP-FEEDING IN THE TESTS OF FEEDERS.

That we had a good opportunity of making observations on feeding methods last year is easily seen, for at Booborowie Experimental Farm we started hand-feeding the rams and ration sheep in early March, from April 1st to May 27th (57 days), an average number of 1,060 sheep were fed every day, and hand-feeding was not absolutely discontinued until August 28th. During this period 32 tons of chaff, 15,000lbs. of barley, and 10,600lbs. of oats were used for sheep.

## SUMMARY.

In the observations made at Booborowie Experimental Farm on methods of hand-feeding sheep with chaff and grain for a short period, it appears:—

1. That a three-wire bag trough, with bags fastened to wires supported on diagonal crosses, is quite satisfactory, except that it is not easy to change the feeding-ground.

2. That a bag trough with two top wires 15in. apart, and a bottom wire inside the trough, and 10in. from each top wire, is sufficiently large to properly hold a day's supply of a light feed, such as chaff, when 1ft. of trough is allowed for two sheep.

3. For anything but very small sheep, and where both sides of the trough are open to them, every two sheep should have an allowance of 1ft. of trough length, if all are to have a proper chance of getting their full share of the feed supplied.

4. Where grain is being fed by itself, and where there is plenty of shed space to store when out of use, V-shaped wooden troughs are quite satisfactory.

5. Properly constructed troughs, made with old superphosphate bags, should not cost more than 8d. per foot (including labor) as a first cost. Well-made wooden troughs, large enough to use for chaff and grain, will cost 1s. 6d. per foot.

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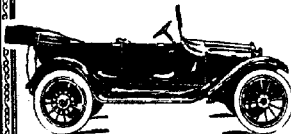
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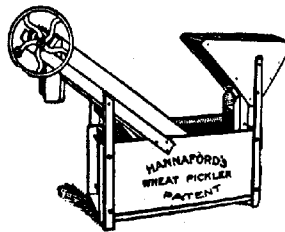
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## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

## Thirty-First Annual Congress.

## PRODUCTION UNDER IRRIGATION ON THE RIVER MURRAY.

[Paper read by H. S. TAYLOR, Renmark Branch.]

The invitation to address this Congress on the subject of irrigation reached me somewhat late in the day, and at a time when pressure of diverse business interests rendered it impracticable for me to devote more than a brief hour or two to the preparation of a paper. But I bethought me of a short general survey of irrigation in Australia which I had recently written for another purpose, and in acceding to your Secretary's request I decided to utilise, as the basis of my paper, this article, which was originally written for the "Australian Trade Promoter," and entitled "Irrigation on the Australian Nile: Australia's Heritage in the Sunraysia Areas." I start, therefore, with a brief general survey of irrigation development in Australia.

## A GENERAL SURVEY.

The practice of irrigation is as old as written history, and older. There is warrant for believing from the Biblical narrative that the Garden of Eden was irrigated, for is it not recorded that "a river went out of Eden to water the garden"? And certainly irrigation was practised in Mesopotamia and Egypt long anterior to the reputed date of the planting of the Garden. In China, as in Egypt, irrigation is immemorial; the Spaniards found it already developed by the Aztecs when Cortez landed in Mexico, and it was practised further north, as the old canalways of Arizona attest, by a people who had already vanished when the white man first set foot on the American continent.

Modern irrigation in America derives from the founders of Salt Lake City, who—first of the Anglo-Saxon pioneers of the arid West—demonstrated the possibility of establishing a nation of home builders in a desolate and rainless land by means of the artificial application of water to the soil. Here in Australia we owe such development as has hitherto been achieved in the art of irrigation to the apostolate of Alfred Deakin and the practical genius of the Messrs. Chaffey—Canadians with American experience. The settlements (or colonies, as they were originally designated) of Renmark and Mildura, founded by the Chaffeys in 1887, under agreements with the South Australian and Victorian Governments, are still the most successful irrigation enterprises in Australia, and are entitled to rank among the most successful examples of high per-acreage productivity in the world.

The broad lines of policy laid down in the Chaffey agreements and the practical methods of irrigation initiated by the Chaffeys are at the

base of whatever corporate irrigation is to-day taking place in Australia. The basic elements of safety and success in the establishment of these irrigation settlements were an indefeasible water right running with the land, and a system of water rating compulsory on all irrigable land embraced in the rated area. American irrigationists paid dearly for their neglect of the first principle, and the Victorian taxpayers paid almost as dearly for their Parliament's neglect of the latter. In America the separation of water from the land early led to the painful realisation of the fact, as once enunciated by Deakin, "that the men who owned the water in an irrigated settlement owned the land and the people on it; and that there was no possible freedom or security unless the water was attached to the land, and could not possibly be separated from it;" and even as late as 1907, 60 years after the Mormon pioneers inaugurated the new era of irrigation in Western America, Elwood Mead could declare of the West generally ("Irrigation Institutions"), "The irrigator whose water right does not furnish grounds for either an inquiry or a grievance is a rare exception." In Victoria the shocking financial failure of the irrigation trusts established by the Government in districts commanded by the Goulburn and Loddon Rivers was directly traceable to the absence of compulsory rating. Settlers only paid for water when they took it, and only took it when dire necessity, in the shape of drought, drove them to do so. To-day, as it has been for a goodly number of years, Mildura is the sole survivor of the original Victorian irrigation trusts. The rest, after a drastic wiping off of their indebtedness, have all reverted to State control. And this despite the fact that at Mildura, as at Renmark, water had to be lifted a considerable height and at a relatively heavy cost, whereas in the State established trusts (as in the Murrumbidgee irrigation areas to-day) it was available for distribution much more cheaply by means of gravitation from storage works.

The working of a compulsory water rate, that is, of a rate levied and collected irrespective of whether water is taken or not, is not only reflected in the financial stability which it affords the Trust or State, or other corporate body administering the watered area, but also in the prevention of speculation in unplanted land and the holding of such areas out of profitable use. Just as it is claimed by land reformers that the single tax on land values would force all owners of land either to make good use of it themselves or to sell to those who would put it to profitable use, so the compulsory water rating instituted in Renmark and Mildura led, automatically, to the intense culture of every irrigable acre within their respective areas. So long as irrigable land was available, it was to be had cheaply by the would-be user, and the area under production is not limited by the speculative holding of unused or only partially used land, but by the water available for lifting and the capacity of the pumps to lift it. Largely to this system of rating may also be attributed the presence in the irrigated areas of a very considerable proportion of men who, starting with little or no capital, have become established in competence and in some cases in affluence.

The prosperity which irrigation spells under conditions of soil and climate such as obtain throughout the Murray Valley may be gauged from the authentic statement that the annual production of the

Renmark and Mildura settlements (including with Mildura the associated area of Merbein, controlled by the Victorian State Rivers and Water Commission) is valued at not less than a million sterling. This wealth is wrested from an irrigated area of slightly over 20,000 acres, and supports a resident population of some 12,000 souls. Prior to the magic wedding of land and water achieved by the Chaffey's, this land was regarded as valueless for aught but pastoral purposes, and its carrying capacity would be but little, if at all, over a sheep to 20 acres. The South Australian sheep run of half a million acres, from which Renmark was carved, and which is still in existence, has not, as a matter of fact, in any single season reached even this average of one sheep to 20 acres. To-day it is realized, as it was not when the Chaffey's started operations in Australia, that it is possible to grow wheat in the mallee with a fair measure of success on the 10in. rainfall which here prevails, provided that provision can be made for the supply of water for stock and domestic purposes. But even if the comparison were reduced from pastoral to agricultural terms, at the most this 20,000 acres would suffice for not more than 20 farmers.

In this class of country, for the most part densely covered with mallee scrub, 100,000 acres, treated as pastoral land has ordinarily been treated in the Australian interior, would be regarded as a very small sheep station indeed; cleared and devoted to agriculture, a thousand acres would be regarded as the minimum area from which, except in specially favored spots, a farmer might hope to win a livelihood. Under irrigation, 15 acres is regarded as sufficient for the needs of a family. There are scores of men in the river settlements who have made good livings on 10-acre holdings, and in one of the South Australian "village" settlements every man jack of a score of settlers succeeded in winning a decent competence from orchards of only eight acres apiece. In this year of high prices for both fresh and dried fruits quite a number of 10-acre blocks have yielded crops valued at over £1,000, and even in the ordinary years there are individual blocks yielding up to this value. Perhaps something like a record for a large property was established in the 1919 season—when prices were not much above the pre-war level—by a Renmark plantation of a little over 100 acres, which gave a gross return of £10,000. In this particular instance the yield comprised, approximately, 100 tons of dried fruits (currants, raisins, and sultanas), 3,000 gallons of olive oil, and several thousand cases of oranges.

It is to production of this character that the irrigation areas on the Murray owe the high per acreage value of their output, and for this class of produce no part of the world is better suited. It was perhaps the absence of any available land within the then settled areas that led the Chaffey's to select the mallee desert—at that time regarded as far beyond the limit of possibly successful "dry" farming—for their great experiment. But in any case the choice was a very happy one. It is now a commonplace that the soil of arid countries is naturally richer than that of humid lands, and in the irrigation districts of the Murray a free and generous soil, wedded to the fertilising waters of the river,



and blessed with abundant sunshine, yields to the intelligent application of labor fruit of a quality which is not surpassed by any which the most favored districts of the old world or of America can show. An experience of over 30 years has amply satisfied the settlers in these areas of the truth of the saying that rain is a mighty poor substitute for irrigation. Crop failures are practically unknown—in the history of the settlements the nearest approach to a general failure was the wiping out of the sultana and muscatel (Gordo) crops by a heat wave in 1905—and the certainty of irrigation leads to the production of a uniform high quality of fruit from year to year which is unknown in districts dependent on a capricious rainfall for the swelling and maturing of their crops.

The one anxiety which has disturbed the settlers in these favored areas has been the fear of over-production. The Australian public has been slow to realise the high food value of dried fruits, and the chances of competing, with profit, in the markets of the world against the low-wage products of the Mediterranean littoral have not appeared inviting. It was to distribute equally among growers the relative loss resulting from the export of the surplus raisins that the Australian Dried Fruits Association—an organisation of growers on an ultra-democratic basis—was brought into being, but the war has altered many things, and at present world prices for dried fruits are so high that the Association, in order to prevent a depletion of the Australian market, and in the absence of any Federal control of export, has been forced to raise the Australian price much beyond its intention or desire. It is probable that a sufficiently large production and a better appreciation of the value of advertising and of the "get up" of produce in attractive forms might have solved the export difficulty even under pre-war conditions. Even before the war Australian dried apricots and pears had at length caught the attention of the British buyer and were commanding prices which rendered their export quite profitable; and at present there are good grounds for believing that valuable export markets, especially in the East, are only awaiting proper exploitation to ensure a ready sale for Australian Sun-Rayseed fruits. In Australia itself there is room for a great increase in the consumption of dried fruits, and the Sun-Rayseed publicity campaign, initiated by the Dried Fruits Association and directed with most conspicuous ability and enterprise by one of the ablest young men Australia has known, is already producing marked effects in this direction. There is no possible doubt of the high value of these fruits. Analysis shows that the food value of 1lb. of Sun-Rayseed raisins is equal to that of 1½lbs. of beef, 5½lbs. of apples, 4lbs. to 5lbs. of bananas, 4lbs. of potatoes, 4lbs. of milk, 4lbs. of fish, or 2lbs. of eggs. The fruit, moreover, is produced by highly paid white labor under conditions which ensure the cleanliness and wholesomeness of the product.

Fruit growing under irrigation, as also to a lesser extent the growing of fodder crops for dairying, makes possible a rural life combined with amenities conspicuously absent from most Australian country districts. The closeness of settlement stimulates social and intellectual intercourse and healthy recreation, and leads to a

marked development of co-operative enterprise. The lifting and distribution of water, except when undertaken by a State department, is a co-operative work, and in every river settlement the principal establishments for the stemming, grading, and packing of the fruit are co-operative concerns; several settlements have co-operative distilleries—originally erected for the treatment of the lowest grade of raisins, but of late years, owing to the great demand for spirit, treating also large quantities of grapes—and in Renmark even the hotel—one of the best appointed country places in the Commonwealth—is the property of the electors. The town is within easy reach of everyone. In Renmark none of the 4,000 residents is living more than four miles from the post office, and in the Mildura district, a population, mainly rural, of nearly 9,000 resides within 10 miles (for the most part within six miles) of the town; and there is room for another 9,000 within this radius. Wealth is evenly distributed, for a large proportion of the gross value of the fruit produced is expended in wages for the cultivation, harvesting, and preparing of the fruit for market. Few settlers are without a motor car, but labor is well paid; the basic wage last year was 11s. 6d. a day, and in the harvest season women earn almost as much as the men, and a lad of 18 is rated a man. Certainly it can be said with confidence that no Australian industry has better repaid the measure of protection which the Federal tariff has afforded it or is more worthy of the confidence and support of the Australian public than the dried fruits industry of the Sun-Raysed irrigation areas.

The plans of the Messrs. Chaffey were laid on broad and bold lines. They were in advance of their time. In all fundamental respects those plans were wisely laid, and have provided a safe foundation for all the subsequent and future building erected and in process of erection on them. But a series of untoward events checked their development for many years. Australians at large were slow to realise the value of irrigation, and though of late years there has been a marked demand for irrigated land, planted properties selling freely at prices ranging up to £200 and even £300 an acre and over, fears of an insufficient supply of water from the river in years of drought have checked development. The adoption of the Murray Waters agreement and the appointment of the Murray Waters Commission to conserve and control the waters of the river by means of storage works and a system of locks and weirs which, while making provision for continuous navigation, will make available for irrigation all the water stored, has removed that fear, and a new era of irrigation expansion has begun. The South Australian Government, which started to lock its portion of the river independently of the other riparian States, in 1910 created a Department of Irrigation and Reclamation, with an experienced irrigationist of rare enthusiasm (Mr. S. McIntosh) at its head, and a number of promising settlements have resulted from its operations. Moreover, the greater portion of the repatriation work in this State is taking the form of settlement in irrigation areas, and the projects now in hand or contemplated provide for the placing of over 3,000 soldier settlers on some 60,000 acres of land. New South Wales has already made provision for its irrigation areas on the Murrumbidgee by means of the Burrinjick dam, and with the Mitta or Hume dam on the Upper Murray now

in course of construction, the Victorian and New South Wales authorities feel justified in embarking on fresh irrigation enterprises in the mid-Murray area. These will also be primarily for soldier settlement, and works have already been commenced which will shortly render available 15,000 acres adjacent to Mildura on the Victorian side, and 20,000 acres on the opposite side of the river—enough to settle some 2,500 soldiers on land of magnificent quality. The Burrinjuck dam holds up 750,000 acre feet of water, the Mitta dam will have a capacity of a million acre feet, and the Lake Victoria storage (from which South Australia will draw its supplies, and which is now well under construction) will provide 500,000 acre feet for the central State; while on the Goulburn the Waranga basin holds 330,000 acre feet, and the Sugar Loaf dam will have a capacity of 300,000 acre feet. (An acre foot, it may be well to explain, is the amount of water sufficient to cover an acre to the depth of a foot.) But when all the water than can be stored has been stored, the area which it will be possible to irrigate from this source is much less than is often inferred. There are many millions of acres suitable for irrigation in the districts through which the rivers flow, but the determining factor with respect to the area to be irrigated is not land but water, and it is not anticipated that the available supplies from the Murray will permit of the safe irrigation of more than a couple of million acres. Those two million acres, however, may be made to yield £100,000,000 of wealth annually, and should directly support a population of something over a million, to say nothing of the stimulus given to collateral industries, such as the production of artificial fertilisers, the making of implements, of wire and wire netting (of which immense quantities are used for the trellising of vines and in the erection of racks for the drying of grape fruits), of building material, and of all garden and household requisites, and the distribution of foodstuffs, and the additional population for which these will provide. So that the anticipated expenditure of six millions or so which the Murray works improvements will involve, and without which any considerable expansion of irrigation enterprise would be impossible, may be reckoned as money well spent in Australia's interests.

#### SOME SOUTH AUSTRALIAN PROBLEMS.

So much for our general survey of the situation. Now for a brief consideration of some of the practical issues of the irrigation policy which this State has adopted and of some of the problems with which producers in the Irrigation Settlements may expect to find themselves faced.

South Australia is deeply committed to a large extension of her present irrigated area. To the irrigable lands of the Murray she looks for the settlement of a large proportion of her repatriated soldiers, and the circumstances which have impelled her to turn to the Murray for this purpose will of necessity lead also to an endeavor to utilise to the fullest extent the quota of the river waters allotted to this State under the terms of the Murray Waters Agreement. For, as I have written elsewhere, South Australia is the driest of all the Australian States:—"Out of its total area of 380,000 square miles no less than 317,600, or 83.6 per cent., has an average rainfall of less

than 10in. Less than 17 per cent. of the State enjoys an annual rainfall of over 10in., and less than 4 per cent. (14,875 square miles) of over 20in. Victoria, the smallest of the mainland States, with a total area of 87,884 square miles, has no land with less than 10in. rainfall, and over 55,000 square miles (or 63 per cent. of the total area) is blest with an average of over 20in." It is apparent, therefore, that if we are to respond to the slogan of "Produce! Produce!" if the increased production which we are assured on all sides is essential for the solvency of the country is to be realised, we cannot afford to allow one drop of water to run to waste that could be profitably utilised for productive purposes.

The area at present under irrigation in South Australia amounts to a little over 30,000 acres, of which some 20,000 acres is under Government control. The area for which it is estimated water will be available when the river is harnessed and controlled amounts to a possible 250,000 acres. On this area, judging from the records of established settlements, it should be possible to maintain a rural population of at least 100,000, with an annual production of some £10,000,000 sterling. Assuming that all this land will eventually be irrigated and settled, what are the lines along which production may be safely recommended?

At present the irrigation areas to which water is lifted by pumping are devoted almost exclusively to the production of dried fruits and citrus and of grapes for wine and spirit; while the reclaimed swamp lands, irrigated by gravitation, are given over to the growing of fodders for dairying and stock fattening purposes. To what extent is this division one that is likely to be or should be maintained in the future?

There is an estimated total in round figures of 280,000 acres of land adjacent to the Murray which is considered suitable for irrigation on an economic basis. Included in this area are 40,000 acres at present covered by Lake Albert, but easily reclaimable, and 75,000 acres which might be made available by the partial reclamation of Lake Alexandrina. The reclamation of this latter area, it may be said in passing, would doubtless be a somewhat costly business, but if worked, as in my opinion it should be, in conjunction with the dredging of a channel through the lake which would allow ocean boats to steam past Goolwa into the Murray itself, thus converting Tailem Bend and Murray Bridge into deep-sea ports—if worked in conjunction with such a scheme the value of the reclaimed land should not only pay for the cost of its reclamation but go far towards paying also for the opening of the lower Murray to deep-sea traffic.

Of the area considered suitable for irrigation on an economic basis, allowing for the swamp lands already reclaimed or in process of reclamation, over 120,000 acres, or nearly half of the total area for which water should be available, will consist of reclaimed land, irrigable by gravitation or by means of extremely low lifts, and most eminently adapted for the growing of fodder crops. And I think it safe to assume that in the main this land will continue to be devoted to such purposes. And for the meat and other animal products to be derived from these crops there is not now, nor is there likely to be for

many years to come, any lack of demand at prices more or less profitable to the grower. It is only in connection with the disposal of the fruit crops, for which the irrigated land of the higher levels is so pre-eminently adapted, that the spectre of overproduction is regarded by many as likely to obtrude itself.

Let it not be supposed that there are no purposes other than the growing of fruit for which these high level lands can be utilised should this bogey-spectre of overproduction ever materialise. Not only are they well adapted for the cultivation of fodders of almost every conceivable kind—and capable always of yielding both a winter and a summer crop—for dairying, lamb fattening, or pig raising, but they are well suited also to the production of sugar beet, cotton, flax, and kindred plants. For various reasons it is not desirable that this valuable land should be devoted to crops of this character at present, and I hope and believe that the time will never come when it shall be necessary to so utilise it. Sugar beet may well be grown on the reclaimed areas of the lakes, not only for the production of sugar, but also as a most valuable adjunct to the dairying and stock-fattening industries; but there are thousands of square miles in Australia, notably along the north-eastern coast, from the Richmond River upwards, dowered with unsurpassable natural facilities for dairying; and over a large proportion of Queensland, extending in the south not less than 300 miles inland from the coast, cotton can be grown as safely as wheat is in the settled areas of this State. On the other hand, nowhere in the world, not even excluding California, can better fruit be produced than is grown on the irrigation areas on the Murray. My own strong feeling is that when a community can produce an article which, in point of quality, will more than hold its own in the markets of the world, it has only to bring the virtues of that article sufficiently before the notice of the world, and in the right places of the world, to secure a market for it; provided that in the meanwhile its production has reached sufficient dimensions to supply and hold the market thus obtained.

As a matter of fact, hardly any branch of Australian industry has failed to be confronted, at some time in its history, with this bogey of overproduction. Fifty years ago first-class dairy butter was selling in this State for 5d. a pound. Thirty years ago our apple growers had already reached what were then regarded as the limits of safe production. Twenty-eight years ago the Australian market was glutted with meat, and a party with which I was associated in Sydney at this time, bought all its supplies of beef, mutton, and pork at an all-round price of 1½d. a pound. Twenty years ago our pastoralists were glad to take 6d. a pound for their wool; settlers at Renmark and Mildura were rooting out their apricot and lemon trees as unprofitable; and oranges were selling at less than half the prices ruling of recent years. In all these instances prices have increased, and the producers have grown more prosperous, as production has increased. And though I am far from asserting that the dried fruits industry is in quite the same class in this connection as those enumerated, the parallel is sufficiently near to warrant the most buoyant hope for the future.

World markets at profitable prices for our dried and citrus fruits have yet to be found and captured. But it is not unreasonable to anticipate that in this business the State Governments, which are so deeply committed to the success of irrigation enterprise, will lend a hand. And already a very good start has been made by the Publicity Department by the Australian Dried Fruits Association, which is assured of a very considerable and growing overseas demand for our fruits or for confections of which they form the base. Also, within two years—thanks to the genius of the young Australian at the head of this department, in whose honor I hope the settlers of the irrigation areas will one day erect a monument worthy of his transcendent services—the Australian consumption of currants, raisins, and sultanas has been increased by 60 per cent. In 1918 the Australian sales of A.D.F.A. fruits of this class amounted to 8,400 tons, which was a record up to that date. In this current year Australian orders, at substantially higher prices, amounted to 13,800 tons. This increase may be attributed almost wholly, if not entirely, to the effects of organisation directed to the conversion of these fruits from an article of luxury in the imagination of the Australian housewife to that of a most wholesome and valuable article of diet.

Similar results have followed the adoption of similar methods in America. Thirty years ago, with an annual production of seven or eight thousand tons, Californian raisin growers were rooting out their vines and going out of the dried fruits business, and as late as 1912, with a pack of 40,000 tons, half of the crop remained unsold at the end of the year, and growers were getting only 3½ cents a pound for their fruit.

In 1914 the Associated Raisin Growers spent 100,000 dollars on an advertising campaign, which that year yielded no results. The following year they spent 150,000 dollars, and results began to come in. Last year, with a record raisin pack of 185,000 tons, the fruit was all sold, much of it before it was picked, at double the prices ruling a few years ago, and the Raisin Growers Association, now spending 400,000 dollars a year on advertising, and claiming as a result that it has "married the American housewife to the raisin," looks forward with confidence to a crop of 225,000 tons in 1923. In addition to the increased home demand, its trade emissaries report markets opening in Japan and China which will absorb all the export fruit America can produce.

Apart from the increased demand for dried fruits, the high prices ruling for wine and spirit grapes have very materially enhanced the prosperity of river settlers of recent years. In view of the possibility, one might say the probability, of prohibition, it would perhaps be unwise to count on the permanence of this factor. So long as the demand for grapes for these purposes lasts, settlers in the irrigation areas will reap a rich harvest from this source. It is no uncommon thing for Gordo vineyards in Renmark and Waikerie to yield 10 tons of grapes to the acre—I have known them yield 12 tons—and Doradillas at Merbein have given 20 tons to the acre; and though these figures are

well above the average for the river settlements, still with grapes bringing from £10 to £12 a ton at the winery, very big money is being made by the growers. This may be a passing phase, and it is impossible at this distance to gauge the extent to which prohibition, by encouraging the illicit production of wine from dried grapes, is responsible for the enormously enhanced demand for raisins in America, where, despite the record home crop, raisins are now being imported from Europe. But after making all necessary allowance for these more or less transient factors, the increasing demand for dried fruits is such as to warrant high hopes for the future of this industry.

And now for a few words on the special lines of development which the fruit business may be expected to take on the Murray. At present the vine is dominant, and is likely to remain so. Not only has it given quicker and surer returns than any of the trees (well-cared-for sultanas reaching almost their maximum development in two and a half years from planting); but the vine has a wider adaptation in the Murray soils than any tree with the exception of the pear and the olive. On the old river flats the stone fruit trees are strong growers and sure and heavy croppers, and this, I understand, also holds good of the heavier lands of the Goulburn Valley and of large spaces on the Murrumbidgee irrigation areas. But the cultivable river flat lands in South Australia are limited in extent, and on the lighter soil of the uplands these trees neither bear so heavily nor live so long. Where salt is present in excess, as it frequently is in the mallee soils, their life is so short that they are not under any circumstances worth planting on a commercial scale. The pear, as already mentioned, has an adaptation almost equal to that of the vine, and nowhere in Australia does the pear grow better or yield better fruit than on the Murray. The orange has a wider adaptation than the peach or apricot, but is more susceptible to the malign influence of salt and seepage than the vine. But nowhere in the world are better navels grown than in our river settlements, and the future of such fruit should be assured. Nowhere, also, are better figs produced, but it has yet to be demonstrated that the Smyrna fig is a commercially payable crop on the Murray. Olives at present are paying very handsomely, and their cultivation is greatly neglected. The prune, which has suffered more than any tree in the irrigation areas from improper pruning and, generally, from a lack of local experiment to determine the varieties and methods of treatment best suited to local conditions, has yielded profitable returns over a long period in certain Mildura orchards, and offers considerable promise of development in our own river settlements.

Of the vine fruits, apart from those grown for the winery or distillery, the sultana, which at present holds pride of place, is likely to increase this dominance. This seedless fruit has almost ousted the muscatel raisin from the Australian housewife's favor, and prospects for the export of the sultana at payable prices have always been better than for the ordinary raisin. The currant at present is paying handsomely, but it may be doubted whether a large export trade, at a profitable figure, can be developed for this fruit. Ever since the stimulation given to the Grecian currant industry by the demand for cur-

rants for wine-making purposes, in the interval between the destruction of the French vineyards by phylloxera and their re-constitution on American resistant stocks, Greece has produced more currants than enough for the ordinary world demand, and America is only now entering the field as a producer of currants.

I envisage, therefore, the planting of the irrigated mallee lands in this State, as also in Victoria and New South Wales, mainly with vines, and of these, principally the sultana (apart from any possible extension of the wine and spirit industry), with citrus fruits, and probably the pear and the prune, occupying second and third places. In addition to these there may ultimately be developed a considerable planting of the apricot and peach in the alluvial flats of our own State, and these fruits will probably predominate in the Goulburn Valley and Murrumbidgee areas. The olive can be grown with profit anywhere as a hedgerow tree. At any rate these are the lines along which development is permitted by the natural conditions of soil and climate. But the lines which development will actually follow will be determined in the future, as in the past, by the relative demand for the various fruits, and the relative cost of their production.

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## ARSENATE OF LEAD.

### ANALYSES MADE BY THE DIRECTOR OF CHEMISTRY.

The following report by the Director of Chemistry contains the results of chemical and physical analyses made under his supervision of samples comprising the undermentioned brands of arsenate of lead on sale in South Australia this season. In a covering note the Horticultural Instructor (Mr. George Quinn) observes:—

“These samples were purchased from Adelaide shops without the purchaser, or the purpose of the purchaser, being known to the sellers. These arsenates are sold in paste or powder forms. The pastes in the first table will be at once detected by the high percentage of moisture revealed in each. In all of the samples tested, the percentage of water soluble arsenic—the form which causes burning of foliage—is well within what is deemed to be the safety limit. In so far as their chemical composition is concerned, every one of these samples may be claimed to represent an article of good average quality. The attention of orchardists, however, is specially drawn to the suspension tests. This power of remaining in suspension has a most important bearing upon securing an even and effective coating of the poison over the surfaces of the fruits or foliage. The power of remaining suspended in water indicates the degree of fineness of subdivision of the particles of which the compound is composed, and it should be borne in mind that no amount of stirring or agitating in the spraying tank can bring a more coarsely ground arsenate of lead which is equally insoluble in water to a condition capable of forming so complete a protective film.”

The report of the Director of Chemistry states:—The 10 samples of arsenate of lead which were received from the Horticultural Instructor on November 13th, 1920, have been analysed, with the following results:—

No.	Brand.	Moisture.	As <sub>2</sub> O <sub>3</sub> .	PbO	Water soluble.
		Per cent.	Per cent.	Per cent.	As <sub>2</sub> O <sub>3</sub> . Per cent.
1.	Blyth's "Bluebell" . . .	44.5	16.6	34.1	0.13
2.	Bickford's "Aero" . . .	0.15	31.7	60.2	0.14
3.	Berger's . . . . .	45.4	14.7	36.3	0.13
4.	Cooper's . . . . .	45.1	16.6	32.7	0.13
5.	"Electro" paste . . . .	0.42	30.1	62.6	0.09
6.	"Electro" powder . . . .	0.16	33.0	59.0	0.11
7.	"Green Cross" . . . . .	0.08	30.7	61.6	0.09
8.	Jacques Pty., Ltd. . . . .	54.7	14.5	28.3	0.13
9.	Swift's . . . . .	46.2	15.8	33.2	0.16
10.	"Vallo" . . . . .	46.4	15.3	35.0	0.05

The figures given in the table below represent the result on the dry basis:—

No.	Brand.	As <sub>2</sub> O <sub>5</sub>	PbO	Water soluble. As <sub>2</sub> O <sub>5</sub>
		Per cent.	Per cent.	Per cent.
1.	Blyth's "Bluebell"	30.2	62.0	0.23
2.	Bickford's "Aero"	31.7	60.3	0.14
3.	Berger's	26.9	66.5	0.23
4.	Cooper's	30.2	59.6	0.23
5.	"Electro" paste	30.2	62.8	0.09
6.	"Electro" powder	33.0	59.1	0.11
7.	"Green Cross"	30.7	61.6	0.09
8.	Jacques Pty., Ltd.	32.0	62.5	0.29
9.	Swift's	29.3	61.8	0.29
10.	"Vallo"	28.6	65.4	0.09

#### SUSPENSION TEST.

The quantity of arsenate of lead remaining in suspension in water, when the samples were mixed with water in the proportion recommended for spraying, was estimated by the following test:—

A weight of arsenate of lead equivalent to 0.5gram. of the moisture-free sample was mixed with distilled water in a mortar to a thin paste. The paste was then washed into a glass cylinder, and made up to 250 c.c. with distilled water. The cylinder was shaken for one minute. After standing for five minutes, 50 c.c. of the liquor was drawn off from a point midway between the bottom of the cylinder and the top of the liquor. The 50 c.c. was filtered, and the lead arsenate collected on the filter was dried and weighed. The weight of dry arsenate of lead obtained from 50 c.c. of the liquor was calculated to the percentage of the 0.5gram. of dry arsenate of lead taken, and thus gives an indication of the arsenate remaining in suspension after standing for five minutes. After standing for 15 minutes another 50 c.c. of the liquor was drawn off and treated in the same way as the portion drawn off at the end of five minutes. The results are given in the following table:—

No.	Brand.	Percentage of arsenate of lead remaining in suspension after standing five minutes.	Percentage of arsenate of lead remaining in suspension after standing fifteen minutes.
1.	Blyth's "Bluebell"	23.7	6.75
2.	Bickford's "Aero"	59.95	30.6
3.	Berger's	40.5	24.7
4.	Cooper's	42.0	21.2
5.	"Electro" paste	22.85	6.2
6.	"Electro" powder	18.3	4.35
7.	"Green Cross"	25.6	0.9
8.	Jacques Pty., Ltd.	89.35	41.2
9.	Swift's	53.35	35.3
10.	"Vallo"	39.7	12.1

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on January 1st:—

**BUTTER.**—The season has undoubtedly been an exceptionally favorable one for the marketing of dairy produce, not only in assisting the forwarding of larger quantities, but also the standard of quality has been of a decidedly higher grade. Supplies have been very substantial, and a surplus of over a thousand tons has been placed in cold store on account of the Imperial Government contract. However, the extreme heat experienced towards the close of last month very much affected the quality of many lots, so that first grades have become rather scarce. Some factories continue to send on bulk for export, but mostly of second and third grades. Values throughout the month have only shown slight fluctuations: factory and creamery, in prints, 2s. 5d. to 2s. 6½d. per lb.; best separators and dairies, 2s. 4½d. to 2s. 5½d.; fair quality, 2s. 2d. to 2s. 3½d.; well-conditioned store and collectors', 2s. to 2s. 1d.; weather-affected lots, 1s. 10d. to 1s. 11d. per lb.

**EGGS.**—Supplies have kept up remarkably well, no doubt the green feed assisting in this direction. The quantities coming forward have been much larger than anticipated earlier in the season, but as local picklers have ceased operations values have come back slightly, at the close of the month hen eggs selling at 1s. 5d.; duck, 1s. 6d. per dozen.

**CHEESE.**—The South-East factories have sent along large parcels each week, but owing to good local trade, coupled with nice export orders for Western Australia good clearances have been effected. Values are unaltered, viz., 12½d. to 13d. per lb. for large to loaf.

**HONEY.**—Very fair lots have come to hand of the new take, the quality of which has opened out very satisfactorily. Buyers have operated freely for prime samples at 6½d., but second grades find slow sale at 5d. to 5½d.; beeswax wanted at 1s. 10d. to 2s. per lb. according to quality.

**ALMONDS.**—There is no alteration to report in this line, only small lots arriving, which are going out at—Brandis, 10d.; mixed softshells, 9d.; hardshells, 5d. kernels, 2s. 3d. per lb.

**BACON.**—The warmer weather has caused much better demand, sides and middle finding good sale, whilst hams have participated in the usual Christmas demand. Best factory-cured sides, 1s. 6d. to 1s. 6½d.; middles, 1s. 7½d.; hams, 1s. 11d. to 2s. per lb.

**LIVE POULTRY.**—Very heavy quantities have been forwarded throughout the month, and a pleasing feature is the heavy demand that was experienced. Each market was readily cleared, and prices were very satisfactory to consignors. Heavy-weight table roosters, 5s. 6d. to 8s. 3d. each; nice-conditioned cockerels, 4s. to 5s. 3d.; plump hens, 3s. 6d. to 5s. 6d.; light birds, 2s. 6d. to 3s. 3d.; ducks, prime, 5s. 6d. to 8s. 6d.; fair quality, 3s. 3d. to 5s. 3d.; geese, prime, 9s. to 12s.; fair, 6s. 9d. to 8s. 9d. each; pigeons, 9d. each; turkeys, from 1s. 9d. to 2s. 4d. per lb. live weight for good to prime table birds; fair quality, 1s. 3d. to 1s. 8d. per lb.; fattening sorts, down to 8½d. per lb.

**POTATOES.**—Quantities of locally grown being marketed are heavy, while there are a few trucks of early Gambiers also arriving, and values have eased rapidly throughout the past month. **ONIONS.**—These are also in plentiful supply. Quotations:—Potatoes, new, £7 to £8 per ton on trucks Mile End. Onions, £7 to £8 per ton on trucks Mile End.

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## THE AGRICULTURAL OUTLOOK.

### REPORT FOR THE MONTH OF DECEMBER.

The following reports on the general Agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

*Booborowie.*—Weather—On the whole it has been wet for December, 192 points of rain having been registered here, and in places in this neighborhood, I believe, over 2in. has been registered for the month; 22.22in. is the total for the year. Crops—These are, generally speaking, good, and in some instance have lodged badly where rankly grown. The recent rains have bleached the grain. All hay not carted in is badly discolored on the outside of stacks. Natural feed is very plentiful. Stock are all in good condition, and should do even better now that most of the seeds have fallen. Pests—Saffron thistles are doing remarkably well this year, and appear to be over-running the country after a few years' partial absence.

*Eyre Peninsula.*—Weather—Very unseasonable, it being generally cool for December, excepting four or five days from the 20th. Thirty-six points of rain fell during month in six days, being well distributed over the month. Harvesting has been delayed considerably owing to cool and damp conditions. Crops—Exceptionally good growth, and filling generally. Some badly lodged, in which cases the straw is very rotten, making use of false combs difficult. Quite a number of settlers are complaining of bunt. Natural feed has completed casting seeds, and there seems little in it for stock, but there is still abundance in scrub lands. Stock—Healthy, but need hand feeding. Pests—Cut worms have been considerable trouble to any succulent growth; but the few very warm days at Christmas time seems to have checked them. Miscellaneous—Blowflies are remarkably thick, but have temporarily disappeared since last rain.

### SEED WHEAT.

The Department of Agriculture has for sale at the Mount Remarkable Training Farm approximately 4,000 bags of seed wheat, at the price of 10s. per bushel. Application for supplies should be made to the Director of Agriculture, Adelaide, or the Manager of the Mount Remarkable Training Farm. In view of the fact that this institution is about to be closed, early application should be made, otherwise it will be necessary for the grain to be placed in the Pool. The varieties and the quantity of each available are:—Queen Fan, 1,140 bags; King's White, 800; Late Gluyas, 520; Leak's Rust-proof, 470; Caliph, 480; Onas, 350; Marshall's No. 3, 300; Yandilla King, 248; Crossbred No. 53, 70; Huguenot, 42.

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## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, December 8th, there being present Mr. C. J. Tuckwell (Chairman), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), Messrs. T. H. Williams, H. Wicks, W. S. Kelly, Col. Rowell, and the Acting Secretary (Mr. H. J. Finnis). Apologies were received from the Director of Agriculture (Professor Arthur J. Perkins), Capt. White, and Messrs. G. Jeffrey and A. M. Dawkins.

*Water Conservation on Eyre Peninsula.*—At the 1919 Conference of Eyre Peninsula Branches of the Bureau a resolution was carried asking that the Government be urged to construct tanks sufficiently large to hold all the water off the granite outcrops on Eyre Peninsula. The matter was submitted to the Engineer-in-Chief for a report. In discussing the question, Mr. C. J. Tuckwell said he was on the Peninsula 12 months ago, and he felt that everything that could be done should be done for the settlers there. Col. Rowell was of the opinion that the Government could not go wrong anywhere with the conservation of water. He then moved, "That the Government be asked to utilise all the granite outcrops on Eyre Peninsula to the fullest extent for the conservation of water." The motion was seconded by Mr. H. Wicks, and carried.

*Freight on Fencing Material.*—At the last Conference of Pinnaroo Line Branches a resolution was carried, asking the Government to reduce the freight on fencing materials to the same rate as that for firewood. After giving the matter consideration the Board decided that it could not support the resolution.

At the thirtieth Annual Congress the following resolution was carried, "That the Government be asked to establish at once an experimental forest in the Sandalwood district to ascertain what, if any, trees can be grown here with a view to providing (a) posts for fencing and shed building, and (b) quick-growing windbreaks." In order that some idea of the class of timber suitable for growing in the mallee districts might be obtained the Board asked for a report of the work being carried out at the Parilla Forest Reserve. A copy of this report will be found on another page of the *Journal*.

*Galvanized Iron for Water Catchment Purposes.*—The suggestion emanating from the thirty-first Annual Congress that galvanized iron for water catchment purposes be supplied by the Government to settlers in dry areas on the same terms as the Government now supplies fencing materials was discussed. The Board realised that it was desirable that the settlers on the Peninsula should be assisted in every possible way with the conservation of water, but considered that the suggestion was not a feasible one.

*State Steamer for Eyre Peninsula.*—The Conference of Eyre Peninsula Branches resolved, "That the Government be urged to trade a line of steamers between the West Coast and the mainland." The matter was submitted to the Chairman of the Harbors Board, who

has supplied the following report:—"Apart from the question of the large and excessive cost of launching a scheme of this nature at the present time, the Board consider that it would be inadvisable for the Government to accede to this request. The trade to the West Coast is for the most part fluctuating, and would certainly not bear profitable competition." On the motion of Mr. Colebatch, seconded by Mr. Kelly, it was decided that the Secretary should inform the Branches concerned that the matter had been referred to the authorities, and that no further action could be taken.

*Bonus for Shoot Scorchers.*—A communication was received from a member of the Coonalpyn Branch suggesting that instead of offering a bonus for a shoot scorchers the Government should set aside an amount of money, and call for tenders for 100 fire rakes, and offer the machines to settlers at cost price, giving each purchaser the opportunity of selecting any make of rake that he desired. After discussing the matter the Board decided that the suggestion could not be entertained.

*Trucking Facilities for Wilkawatt.*—The Railways Commissioner notified the Board that it had been decided to erect combined sheep and cattle trucking yards at Wilkawatt. The Secretary was instructed to advise the Branch of the Commissioner's decision.

*Take-all.*—The Yadnarie Branch asked that the Board might reconsider its decision not to support the suggestion that a bonus be offered for a means of combating take-all. After consideration the Board decided not to depart from its previous determination.

*Weighing Mallee Stumps on Railways.*—A report was received from the Railways Commissioner with respect to a complaint that mallee stumps had been weighed incorrectly. In the report it was mentioned that railway weights were for freight purposes only. Mr. Colebatch mentioned that in many instances farmers and others trucking mallee roots had no means of ascertaining the weights other than by recourse to the railway bridges. It was determined, therefore, to ask the Railways Commissioner whether it would be practicable for his department to weigh consignments, and issue notes of weights which could be used as a basis of sale.

*Veterinary Surgeon for Eyre Peninsula.*—This matter was again brought before the Board, and it was decided to defer the question until next meeting.

*Enforcement of Residential Clauses of Leases.*—A communication was received from the Coomandook Branch, drawing attention to the fact that there were many blocks in their district on which the conditions of the leases were not being carried out. The Branch pointed out that the blocks were harboring vermin that swarmed out on to the adjoining blocks, and ate the grass and crops. The Board decided to ask the Lands Department to investigate this matter and furnish a report.

*Wheat Pool.*—The Board decided to forward to the Minister of Agriculture, for his information, a resolution from the Wudinna Branch urging the discontinuance of the Wheat Pool.



*Appointment of Dairy Instructors.*—The following resolution was submitted by the Kongorong Branch, "In the opinion of this Branch of the Agricultural Bureau it is highly desirable that the Department of Agriculture appoint two or more dairy experts to visit the dairy farms of the State, advising on herd improvement, production of foddors, milk and cream preservation, pig breeding, calf raising, and kindred matters." It was decided to transmit the resolution, and at the same time direct attention to a report on the dairying industry which the Board had previously submitted.

*Resolutions from Minnipa Conference.*—The following resolutions were carried at the recent Conference of Eyre Peninsula Branches of the Agricultural Bureau:—(a) "That the Railways Standing Committee be urged to visit Eyre Peninsula with a view to inquiring into the necessity for more adequate railway facilities, more particularly to open up new land in a north-westerly direction from Kimba, to connect Mount Damper with the existing trunk line, and to connect Poochera Siding and Stokes Corner." The Board decided to ask the Minister of Agriculture to bring this matter under the notice of the Railways Standing Committee. (b) "That this Conference asks that adequate trucking facilities and sheets be provided for the transport of super during the coming season." During the course of the discussion attention was directed to the apparent shortage of sheets, and it was decided to ask the Railways Commissioner whether some means other than the usual sheets could be devised to protect superphosphate and other such materials in transit on the railways. (c) "That this Conference ask the State Government to approach the Federal Government with a view of forming a local repatriation committee for the central hundreds of Eyre Peninsula." It was decided to forward this resolution to the Minister of Agriculture, with the full support of the Board. (d) "That this Conference, through the Advisory Board, strongly urge that a small motor train, similar to that used on the South-Eastern railway lines, be stationed on the Thevenard line." Mr. W. S. Kelly pointed out that if such a train were obtained it could be used as a means for conveying those men north of Minnipa who were desirous of visiting the Annual Conference at Minnipa. It was decided to forward the matter to the Minister, and ask that the resolution be brought under the notice of the Railways Standing Committee. (e) "That this Conference urge the Government to push on with the Poldo water scheme, ultimately utilising the reticulation in connection with the Tod River water scheme." The Board decided to transmit the matter to the Minister, with the recommendation that the Government should do all in its power for the conservation of water for the settlers on the Peninsula. (f) "That this Conference strongly urges the Government to take a referendum of wheat growers regarding the continuance of the Wheat Pool." It was decided to take no action in this matter. (g) "That the State Railways Department be approached with a view of getting a refrigerating car on the Eyre Peninsula railway lines for the purpose of carrying perishable goods during the summer months." It was decided to forward the resolution to the Minister, with a request that if possible steps should be taken in the

direction suggested by the Conference. (h) "That this Conference, representative of the Branches of the Bureau on Eyre Peninsula, protest strongly against the third jetty being built at Port Lincoln, and insist on having a wharf." It was decided to transmit this resolution to the Minister, for his information, and at the same time intimate that the Board desired to express no opinion thereon. (i) "That this Conference urge on the Government that we want at least 5s. for the first payment of this year's wheat."

*Licensing of Bulls.*—A communication was received from the Stock Owners' Association of South Australia, intimating that at its last meeting a resolution was carried, "That it is desirable in the interest of all connected with cattle raising that provision be made for the licensing of bulls within the area of hundreds of South Australia, and that the matter be brought before the Minister of Agriculture by a deputation of three representatives each from the Australian Jersey Herd Society, the Royal Agricultural and Horticultural Society, the Advisory Board of Agriculture, and this association." The Director of Agriculture (Professor Arthur J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), and Mr. W. S. Kelly were appointed as a subcommittee to act on behalf of the Board in this matter.

*Lucerne Land for Booborowie Experimental Farm.*—On the occasion of its recent visit to the Government Experimental Farm at Booborowie, the Board noticed the extensive area of country adapted to the cultivation of lucerne. This crop was receiving considerable attention in the locality under notice, but the Board has reason to believe that in most instances the maximum results are not being secured. The fact that the Booborowie Experimental Farm does not include any of the lucerne land, it is felt, places the officers of the department at a disadvantage. If a small area were added to the farm, there is reason to believe that experimental and demonstration work would go far toward improving the cultural practices. There is an area of about 20 acres of suitable lucerne country opposite sections 469 and 470, included in the stock road which passes the eastern boundary of the homestead block of the farm. The Board suggested that steps should be taken to resume, for the purpose mentioned, that portion of the stock road running along the eastern boundary of the Booborowie Experimental Farm, from the southern boundary of the hundred of Anne to the northern boundary of section 468, provision being made, however, for a right of way for the occupiers of sections 469 and 470.

*New Members.*—The under-mentioned names were approved for addition to the rolls of existing Branches:—Warrow—R. Puckridge; Salt Creek—P. Gendera; Younghusband—C. Gardiner, J. W. Chambers; Renmark—Col. W. Dollman, W. Dollman, jun., F. Jackman, J. V. Angus, W. Carmody, S. Riddell; Kybybolite—B. D. E. Bottrill; Inman Valley—J. W. Crompton; Ramco—A. P. Johns; Lone Pine—H. Kappler, M. Ellis, R. Schrapel, G. Crane, C. Goers, W. Ahrens, T. Wallace, G. Wallace; Renmark—Capt. V. Piercy, G. Dunstan, A. J. Lamey, C. Hill, V. L. Stephens, E. H. Ridgway, J. Taylor; Lone Gum

—A. Johanson, K. G. Feige, W. M. Underwood; Watervale—R. D. Newland, W. A. Allen; Kongorong—J. MacNicol; Yadenarie—R. Kain, Glossop—G. Smith, W. Murphy, A. F. Heinicke, G. H. Browne, F. Cottrell, D. Brooks; Williamstown—C. Ross, G. Brown, A. S. Grigg, W. S. Dyer, J. N. Paterson, D. Coleman, D. Manser, A. Langdon, N. J. Dyer; Miltalie—J. W. Deer; Barmera—W. E. Rix, M. H. Eakin, E. D. Sims, F. Oldham, A. Snow, J. Dunstone; Moonta—T. Trembath; Meadows—G. Pike, R. Milligan; Warcowie—J. Buckley.

## ORCHARD NOTES FOR JANUARY.

[By C. H. BEAUMONT, Orchard Instructor.]

### WOOLLY APHIS.

There is no doubt but that this pest has increased at an alarming rate during the past few years. Why this is so I am not prepared to say. The best remedy we have to control it is Black Leaf 40, which is a sulphate of nicotine solution. It is an expensive solution to buy, but it does not require very much of it, as it is highly diluted before use. One pint in 100 to 120 gallons of spray will do good work. It may be mixed direct with the arsenate of lead spray, with or without soap. The principal thing to remember when spraying is that a strong jet is required in order to get through the woolly covering, and thus reach the body of the insect. It is well to go around the trees within a few days and touch up any patches of aphid still living with a paint brush and the spray solution.

Kerosine emulsion made from the prepared soap is a good remedy if Black Leaf 40 cannot be obtained. Thoroughness in the operation of spraying must be observed.

### CODLIN MOTH.

Keep a coat of arsenate of lead spray over the late apples and pears.

### BLACK SPOT OR FUSICLADIUM.

Results of spraying to prevent this fungus pest this year have demonstrated conclusively the high value of the copper sulphate sprays, either Bordeaux Mixture or Burgundy Mixture, and in orchards where these have been properly prepared and used very little black spot can be found. Lime sulphur and other compounds have not given results in any way to approach the copper sulphate sprays.

### GRAPE VINES.

Many folks have been worried by grapes drying on the vines, and have thought they must be suffering from some disease. The grapes are in reality scorched by the great heat they have undergone; leaves dropping off, but no serious harm will result.

## EGG-LAYING COMPETITION, 1920-1921.

HOLD AT THE PARAFIELD POULTRY STATION, PARAFIELD, UNDER THE DIRECTION  
OF D. F. LAURIE (GOVERNMENT POULTRY EXPERT AND LECTURER).

THREE MONTHS' TEST STARTED ON APRIL 1st, 1920, AND TO TERMINATE MARCH 31st, 1921.]

## SECTION I.—LIGHT BREEDS (SINGLE TESTING). THREE PULLETS IN EACH ENTRY.

Name and Address.	Bird No.	Month ending 31/12/20.	Score to Date.	Bird No.	Month ending 31/12/20.	Score to Date.	Bird No.	Month ending 31/12/20.	Score to Date.
WHITE LEGHORNS.									
Isaacs, C. B., Kensington	1	19	109	2	24	99	3	24	104
Donnell, G., Auburn, Melbourne	4	22	96	5	22	111	6	Dead	
My, R. S., Hamley Bridge	7	17	81	8	6	48	9	23	117
My, J., Silvan, Victoria	10	22	102	11	20	133	12	22	108
My, J. P., Ballarat, Victoria	13	22	148	14	Dead		15	18	142
My, A. H., Richmond, S.A.	16	18	77	17	3	65	18	17	97
My, W. P., Eudunda	19	23	67	20	Dead		21	19	100
My, W. P., Eudunda	22	13	102	23	20	97	24	18	84
My, C. J., Mallala	25	—	—	26	—	—	27	—	—
My, E. W., Scott's Creek	28	11	52	29	13	52	30	15	63
My, J. P., Ballarat, Victoria	31	22	103	32	21	121	33	23	138
My, H. B., Kew, Victoria	34	12	71	35	18	73	36	21	139
My, A. J., Woodside	37	14	87	38	19	108	39	23	133
My, H. S., Broken Hill	40	—	—	41	21	116	42	24	104
My, W., Broken Hill	43	—	—	44	—	—	45	12	64
My, E. W., Scott's Creek	46	23	87	47	—	—	48	—	—
My, E. D., Kadina South	49	—	—	50	19	84	51	19	91
My, Poultry Farm, Kilkenny	52	21	67	53	15	90	54	—	—
My, H. V., Wallaroo	55	—	—	56	18	67	57	—	—
My, Mrs. S., Piccadilly	58	20	87	59	21	107	60	24	112
My, E. H., Pinnaroo	61	24	111	62	9	42	63	15	71
My, Poultry Farm, Kilkenny	64	23	120	65	24	121	66	16	92
My, H. J., Broken Hill	1	17	108	2	22	108	3	24	114
My, River Poultry Farm, Mt. Gambier	4	24	148	5	24	147	6	21	145
My, Mrs. G., Milang	7	22	102	8	21	87	9	22	104
My, M., Broken Hill	10	21	122	11	—	—	12	14	85
My, Wm., Sefton Park	13	21	109	14	22	131	15	—	—
My, A., Goodwood	16	22	106	17	11	105	18	22	96
My, Wm., Magill	19	20	104	20	18	99	21	21	108
My, Mrs. M., Berowra, N.S.W.	22	18	110	23	11	109	24	23	121
My, M., Cheltenham	25	19	99	26	22	135	27	17	134
My, W. H., Glenelg	28	18	119	29	22	150	30	17	126
My, Poultry Farm, Blackwood	31	21	119	32	20	108	33	19	108
My, H. H., Mount Gambier	34	19	124	35	22	121	36	19	120
My, A. J., Crystal Brook	37	18	131	38	27	162	39	20	86
My, F. W. H., Monteith	40	22	148	41	20	130	42	19	126
My, J., Lockleys	43	—	—	44	—	—	45	—	—
My, E. W., Mount Gambier	46	17	84	47	15	93	48	21	90
My, C., Alberton	49	24	108	50	23	96	51	25	141
My, F. A., Naracoorte	52	22	93	53	22	90	54	24	102

\* Failed under Regulation 12

## EGG-LAYING COMPETITION—continued.

Row No.	Name and Address.	Bird No.	Month ending 31/12/20.	Score to Date.	Bird No.	Month ending 31/12/20.	Score to Date.	Bird No.	Month ending 31/12/20.
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## WHITE LEGHORNS—continued.

B	Green, F. W. H., Monteith .....	155	17	83	56	17	134	57	23
B	Herbert, C., Alberton .....	58	2	50	59	22	83	60	19
B	Uriwin, A. P., Balaklava .....	61	21	116	62	19	87	63	22
B	Purvis, W., Glenville Blocks .....	64	23	88	65	6	114	66	20
C	Green, F. W. H., Monteith .....	1	22	100	2	18	111	3	17
C	Holmes, F. A., Naracoorte .....	4	22	95	5	23	84	6	*
C	Axtell, Mrs. J., Glen Osmond .....	7	16	93	8	19	104	9	13
C	Finn, H. J., jun., Angaston .....	10	22	78	11	23	83	12	16
C	Coleman, A. C., Grange .....	13	17	76	14	24	125	15	19
C	Green, F. W. H., Monteith .....	16	20	144	17	22	139	18	19
C	Anderson, J., Prospect .....	19	*	*	20	*	*	21	11
C	Axtell, Mrs. J., Glen Osmond .....	22	*	*	23	18	85	24	17

## TWO WHITE LEGHORNS, ONE ANCONA

C	Tester, Geo. P., Naracoorte .....	25	14	91	26	22	145	27	20
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## SECTION 2.—HEAVY BREEDS (SINGLE TESTING). THREE PULLETS IN EACH ENTRY

## BLACK ORPINGTONS.

C	Lawson, E. A., Camberwell, Victoria .....	28	12	64	29	14	88	30	13
C	Bertelmeier, C. B., Kensington ..	31	Dead		32	14	109	33	11
C	Shaw, R. R., Crystal Brook .....	34	18	115	35	12	89	36	15
C	Jarman, T. E., Epping, N.S.W. .	37	*	*	38	*	*	39	16
C	Hogg, R. J., Morphett Vale .....	40	19	83	41	16	95	42	*
C	Shaw, R. R., Crystal Brook .....	43	19	112	44	12	72	45	13
C	Holmes, F. A., Naracoorte .....	46	14	65	47	15	61	48	10
C	Buttfield, C. C., Crystal Brook ..	49	17	93	50	Dead	*	51	17
C	Shevill, W. A., Beaumaris, Victoria	52	18	78	53	*	*	54	13
C	Eckermann, W. P., Kadunda .....	55	*	*	56	16	103	57	9
C	Lampert, Mrs. S., Piccadilly .....	58	7	100	59	20	93	60	*
C	Bansemmer, Mrs. B., Beaumont ..	61	17	106	62	21	128	63	17
C	Stebler, J. M., North Broken Hill	64	*	*	65	*	*	66	22
D	Holmes, F. A., Naracoorte .....	1	—	148	2	Dead		3	16
D	Purvis, W., Glenville Blocks .....	4	13	99	5	Dead		6	18
D	Bertelmeier, C. B., Kensington ..	7	16	156	8	24	112	9	18
D	Tester, G. P., Naracoorte .....	10	15	87	11	10	69	12	23
D	Kalms, A. G., Neale's Flat .....	13	Dead		14	15	84	15	14

## RHODE ISLAND REDS.

D	Stacey, R. S., Hamley Bridge ..	16	17	73	17	16	68	18	23
D	Stockman, A., Goodwood .....	19	13	95	20	13	96	21	15

## RHODE ISLAND WHITES.

D	Bansemmer, Mrs. B., Beaumont ..	22	14	80	23	*	*	24	24
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\* Failed under Regulation 12.

## SECTION 3.—LIGHT BREEDS (PEN TEST). SIX PULLETS IN EACH PEN.

Pen No.	Name and Address.	Breed.	Eggs Laid for Month Ending 31/12/20.	Total Eggs Laid from 1/4/20 to 31/12/20.
1	Hodges, F., Ballarat North, Victoria	White Leghorns	121	877
2	Bertelsmeier, C. B., Kensington	"	102	720
3	Beythien, E. W., Scott's Creek	"	94	581
4	McDonnell, G., Auburn, Victoria	"	100	738
5	Bertelsmeier, C. B., Kensington	"	88	649
6	Thompson, E. F., Franklin	"	83	673
7	Purvis, W., Glanville Blocks	"	106	710
8	Smith & Gwynne, Gawler South	"	87	584
9	Anderson, S., Gawler Railway	"	116	851
10	Eckermann, W. P., Eudunda	"	88	617
11	Beythien, E. W., Scott's Creek	"	97	566
12	George, R., New Queenstown	"	96	719
13	Descon, J. R., Solomontown	"	91	691
14	Alford, Thos., Broken Hill	"	120	874
15	Evans, H. A., Richmond	"	—	—
16	Connor, D. C., Gawler	"	94	643
17	Raymoor Poultry Farm, Kilkenny Blocks	"	124	797
18	Lampert, Mrs. S., Piccadilly	"	82	522
19	Pool, F. J., North Norwood	"	113	503
20	Woodhead, N., Torrensview	"	79	590
21	Thompson, E. F., Franklin	"	119	570
22	Randall, J., Bowden	"	81	415
23	Earle, E., Solomontown	"	—	—
24	Willington, Mrs. G., Milang	"	109	660
25	Veroes, Wm., Sefton Park	"	125	819
26	Pugsley, A., Hindmarsh	"	47	477
27	Howie, H. H., Mount Gambier	"	101	671
28	Purvis, W., Glanville Blocks	"	101	625
29	Anderson, W., Kapunda	"	74	508
30	Broderick, P. J., Burra	"	—	—
31	Eldridge, J. H., Norwood	"	94	687
32	Pope Bros. & Co., Hectorville	"	96	538
33	Oakey, E., Mannahill	Brown Leghorns	108	547

## SECTION 4.—HEAVY BREEDS (PEN TEST). SIX PULLETS EACH ENTRY.

34	Hogg, R. J., Morphett Vale	Black Orpingtons	—	—
35	Bertelsmeier, C. B., Kensington	"	—	—
36	Eckermann, W. P., Eudunda	"	77	585
37	Lampert, Mrs. S., Piccadilly	"	23	581
38	Bertelsmeier, C. B., Kensington	"	69	509
39	Bansemmer, Mrs. B., Beaumont	"	63	485
40	Purvis, W., Glanville Blocks	"	—	—
41	Siebler, J. M., North Broken Hill	"	—	—
42	Bertelsmeier, C. J., Kensington	"	—	—
43	Purvis, W., Glanville Blocks	"	—	—
44	Frost, F. W., Wallaroo	Barred Rocks	77	419
45	Lampert, Mrs. S., Piccadilly	Black Orpingtons	92	814

\* Failed under Regulation 12.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of December, 1920, and the average annual rainfall.

Station.	For Dec., 1920.	To end Dec., 1920.	A'ge. Annual Rainfall
<b>FAR NORTH AND UPPER NORTH.</b>			
Oodnadatta .....	0.52	11.27	4.73
Marree .....	2.00	10.07	6.02
Farina .....	2.39	13.37	6.57
Copley .....	0.62	14.62	8.30
Beltana .....	0.74	14.30	8.93
Blinman .....	0.89	21.53	12.52
Tatcoola .....	0.13	11.89	7.33
Hookina .....	1.05	23.39	12.65
Hawker .....	0.91	26.65	12.37
Wilson .....	0.88	26.09	11.85
Gordon .....	1.08	22.20	10.43
Quorn .....	1.18	23.38	13.79
Port Augusta .....	0.75	16.36	9.42
Port Augusta West .....	0.70	16.34	9.36
Bruce .....	0.99	18.13	9.99
Hammond .....	0.95	22.93	11.36
Wilmington .....	1.09	26.06	18.06
Willowie .....	1.20	18.62	11.82
Melrose .....	1.51	31.28	23.11
Booleroo Centre .....	1.25	19.08	15.51
Port Germein .....	1.04	15.97	12.65
Wirrabara .....	1.88	28.79	19.44
Appila .....	1.46	18.82	14.90
Cradock .....	1.05	23.14	10.82
Carrieton .....	0.97	22.61	12.34
Johnburg .....	0.72	19.80	10.22
Eurelia .....	1.25	21.82	13.11
Orroroo .....	1.31	20.00	13.42
Nackara .....	1.22	19.72	10.63
Black Rock .....	1.04	21.90	12.29
Ucolta .....	0.99	15.44	11.65
Peterborough .....	1.33	17.60	13.28
Yongala .....	2.27	22.38	14.13
<b>LOWER NORTH-EAST.</b>			
Yunta .....	1.49	16.51	8.40
Waukaranga .....	0.98	15.59	8.15
Mannahill .....	1.04	11.01	8.51
Cockburn .....	1.39	13.07	8.03
Broken Hill, N.S.W. ....	0.73	11.71	9.89
<b>LOWER NORTH.</b>			
Port Pirie .....	1.23	17.73	13.26
Port Broughton .....	1.44	18.24	14.13
Bute .....	1.11	20.43	15.55
Laura .....	1.23	22.30	18.12
Caltowie .....	1.67	20.52	17.02
Jamestown .....	1.76	24.97	17.56
Bundaleer W.Wks. ....	1.93	25.20	17.56
Gladstone .....	1.53	21.01	16.05
Crystal Brook .....	1.51	22.38	15.62
Georgetown .....	1.47	26.51	18.30
Narriby .....	1.36	18.48	16.43
Redhill .....	2.17	23.91	16.66
<b>LOWER NORTH—continued.</b>			
Spalding .....	2.00	25.97	20.18
Gulnare .....	1.78	25.22	18.97
Yacka .....	1.92	20.05	15.27
Koolunga .....	1.59	19.85	15.73
Snowtown .....	1.09	19.35	15.87
Brinkworth .....	1.63	22.27	15.61
Blyth .....	1.60	22.21	16.55
Clare .....	2.11	29.80	24.47
Mintaro .....	1.65	29.54	23.07
Watervale .....	1.50	30.77	27.48
Auburn .....	1.02	26.55	17.82
Hoyleton .....	0.76	19.59	15.82
Balaklava .....	0.87	19.15	13.14
Port Wakefield .....	0.69	16.60	13.34
Terowie .....	1.29	16.00	13.97
Yarcowie .....	1.72	17.27	13.54
Hallett .....	2.02	19.71	16.28
Mount Bryan .....	1.83	20.46	16.38
Burra .....	2.18	23.42	17.91
Farrell's Flat .....	1.74	22.12	18.87
<b>WEST OF MURRAY RANGE.</b>			
Manoora .....	1.69	23.43	18.54
Saddleworth .....	1.07	21.94	19.75
Marrabel .....	1.33	24.86	19.44
Riverton .....	0.94	22.13	20.74
Tarlee .....	1.15	18.08	17.86
Stockport .....	1.19	18.28	16.36
Hamley Bridge .....	1.30	17.48	16.32
Kapunda .....	1.75	20.55	19.85
Freeling .....	1.57	18.11	17.95
Greenock .....	1.71	21.71	21.73
Truro .....	2.62	22.08	20.18
Stockwell .....	1.51	20.36	20.40
Nuriootpa .....	1.62	21.62	21.09
Angaston .....	1.49	24.71	22.54
Tanunda .....	1.35	22.32	22.33
Lyndoch .....	1.77	29.26	22.74
Williamstown .....	2.16	29.08	27.74
<b>ADELAIDE PLAINS.</b>			
Mallala .....	1.08	17.94	16.61
Roseworthy .....	1.72	18.64	17.37
Gawler .....	1.61	22.13	19.14
Two Wells .....	1.64	18.50	15.91
Virginia .....	2.06	21.62	17.11
Smithfield .....	2.10	21.71	17.33
Salisbury .....	1.92	20.61	18.32
North Adelaide .....	2.41	30.86	27.87
Adelaide .....	2.10	26.70	21.01
Glenelg .....	1.94	21.72	18.42
Brighton .....	1.69	25.87	21.06
Mitcham .....	2.42	33.98	23.68
Glen Osmond .....	2.44	30.81	25.73
Magill .....	2.10	28.12	25.38

## RAINFALL—continued.

Station.	For Dec., 1920.	To end Dec., 1920.	Av'ge. Annual Rainfall	Station.	For Dec., 1920.	To end Dec., 1920.	Av'ge. Annual Rainfall
MOUNT LOFTY RANGES.				WEST OF SPENCER'S GULF—continued.			
Teatree Gully .....	2-59	31-24	27-73	Cummins .....	1-03	21-92	—
Sirling West .....	2-86	49-15	46-82	Port Lincoln .....	0-74	22-28	19-83
Uraidla .....	3-00	42-82	44-49	Tumby .....	1-31	17-40	14-76
Clarendon .....	1-42	32-37	33-18	Carrow .....	1-57	15-48	15-14
Morphett Vale .....	1-01	23-86	22-90	Arno Bay .....	1-49	14-90	13-10
Noarlunga .....	0-61	23-95	20-21	Cowell .....	1-23	12-42	11-66
Willunga .....	0-77	31-78	25-82	Point Lowly .....	2-41	15-58	11-84
Aldinga .....	0-71	23-28	20-22	Cleve .....	1-07	—	—
Myponga .....	0-97	32-93	—	YORKE PENINSULA.			
Normanville .....	0-81	23-02	20-53	Wallaroo .....	0-46	13-75	14-11
Yankalilla .....	0-87	26-79	22-93	Kadina .....	0-43	19-17	16-93
Mount Pleasant .....	2-65	34-07	27-01	Moonta .....	0-64	16-00	15-31
Birdwood .....	2-87	30-52	29-43	Green's Plains .....	0-79	19-04	15-75
Gumeracha .....	2-92	36-34	33-33	Maitland .....	1-15	20-21	20-20
Millbrook Rvr. ....	3-11	38-57	—	Androsan .....	1-85	16-69	13-96
Tweedvale .....	3-17	39-97	35-60	Port Victoria .....	1-11	17-01	15-34
Woodside .....	2-87	37-74	32-05	Curramulka .....	1-53	18-01	18-31
Ambleside .....	2-10	35-58	34-81	Minlaton .....	1-57	21-28	17-70
Nairne .....	1-58	28-34	28-58	Brentwood .....	1-83	18-43	15-44
Mount Barker .....	2-20	35-63	31-10	Stansbury .....	1-38	15-79	17-08
Echunga .....	1-67	36-66	32-94	Warooka .....	1-06	18-59	17-74
Macclesfield .....	1-17	31-46	30-60	Yorketown .....	1-14	18-35	17-29
Meadows .....	1-17	35-89	36-26	Edithburgh .....	1-14	16-71	16-68
Strathalbyn .....	0-87	20-22	19-28	SOUTH AND SOUTH EAST			
MURRAY FLATS AND VALLEY.				Cape Borda .....	0-91	33-06	24-96
Meningie .....	0-68	17-36	18-77	Kingscote .....	0-43	25-29	18-92
Milang .....	0-51	13-75	15-56	Penneshaw .....	0-42	22-54	21-39
Langhorne's Brdg. ....	0-66	14-78	14-59	Victor Harbor .....	0-68	21-64	21-56
Wellington .....	1-01	13-42	14-82	Port Elliot .....	0-68	21-78	20-00
Tailem Bend .....	1-18	13-83	14-55	Goolwa .....	0-83	16-87	17-87
Murray Bridge .....	1-30	12-13	13-98	Pinnaroo .....	1-44	15-84	15-57
Callington .....	1-12	15-02	15-45	Parilla .....	1-19	18-98	14-02
Mannum .....	2-37	13-69	11-51	Lameroo .....	1-14	16-39	16-45
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Swan Reach .....	1-17	12-79	10-80	Peake .....	0-92	16-25	16-25
Blanchetown .....	0-99	8-90	10-26	Cooke's Plains .....	0-65	13-37	15-00
Eudunda .....	1-30	20-69	17-51	Coomandook .....	0-68	15-22	17-75
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Overland Corner .....	1-61	11-99	11-11	Bordertown .....	0-60	18-54	19-52
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White Well .....	0-68	6-57	9-24	Lucindale .....	0-38	24-19	22-93
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## AGRICULTURAL BUREAU REPORTS.

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Amyton .....	*	1	—	Georgetown .....	*	22	19
Angaston .....	*	—	—	Geranium .....	*	29	26
Appila-Yarrowie .....	*	—	—	Gladstone .....	*	1	1
Artherton .....	*	—	—	Glencoe .....	*	—	—
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Balaklava .....	*	8	12	Goode .....	*	26	23
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Berri .....	*	26	23	Hartley .....	*	—	—
Big Swamp .....	*	20	—	Hawker .....	*	25	22
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Blackwood .....	554	17	21	Hookina .....	528	20	17
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Naracoorte .....	558	8	12	Warcoowie .....	529	—	—
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\* No report received during the month of December. † Held over until next month. ‡ Recess.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

November 25th.—Present: seven members.

**CARE OF FOALS.**—A paper on this subject was read from the *Journal of Agriculture* and discussed by the members. Mr. J. Cann said if a foal was delicate it would not pay to rear it, but a strong foal from good stock should be looked after, because the life of the horse depended on the way it was treated during the first two or three years. He would not let a foal run with a team if it could be avoided. Mr. Barnes said the foal reared with its mother running in a good paddock grew best, and was the healthiest. Mr. G. Heneschke thought a mare with a foal should be spelled, if possible, and when the foal was old enough to wean he would leave it in the paddock, and turn the mare into some distant paddock. Mr. B. Murphy said farmers should breed from the best mares, and the foals should be well looked after, because it was to those they had to look to maintain the team.

ORROROO (Average annual rainfall, 13.42in.).

November 20th.—Present: eight members.

**CONSERVATION OF FODDER.**—Mr. A. N. George, who initiated a discussion on this subject, said many farmers did not take advantage of the seasons of plenty, which often caused a great loss to the State, and the Government should be given power to enforce them to put aside a certain amount of fodder each year. Mr. K. McLean said there was a very luxuriant growth of natural grass to be noticed practically all over that district, and farmers should cut the grass and keep it for bad seasons. Mr. T. Tapscott said it was surprising how few farmers made a practice of saving the cocky chaff. In times of drought it became a very valuable form of fodder.

TARCOWIE (Average annual rainfall, 15½in.).

November 23rd.—Present: 22 members.

**IMPROVING THE HOMESTEAD.**—Mr. W. H. Thomas, who contributed a paper on this subject, expressed the opinion that one of the factors that was contributing towards the drift of the young folk to the city was the number of ill-appointed homes that one saw in the country. Many of the houses simply had flat, low roofs and no verandahs. When the house was being built it was essential that a good foundation should be laid down, provision made for drainage, and the house erected in such a position that the whole of the property could be conveniently worked. The summer months were the most trying time of the year in the majority of districts, especially for the women folk, and as they had to spend practically all of their time indoors it was only right that their comfort and requirements should be studied. The rooms should be large and lofty, with ample provision for ventilation. A verandah on all four sides of the house was a distinct advantage, for it not only kept the weather from damaging the walls, but it also made a great difference in the temperature of the house. The speaker stressed the

need for better appointments in the farm house, especially in connection with the conveniences of the kitchen. If at all possible, a supply of water should be laid on to the kitchen, for the practice of making the women folk go out into the yard to the pump every time water was required was not the right thing. The writer also advised the laying out of a vegetable and flower garden, for it not only provided a continuous supply of fresh vegetables, but would add considerably to the appearance of the homestead. A large underground tank, cellar, and shower bath were also necessities, and would help to make country life more congenial. A presentation was made to Mr. Schrowder, who was leaving the district, in recognition of the valuable work he had performed for the Bureau.

#### WARCOWIE (Average annual rainfall, 12.16in.).

October 27th.—Present: eight members.

**NOXIOUS WEEDS.**—In the course of a discussion that took place on the subject, "Noxious Weeds," Mr. Telfer asked for an expression of opinion as to whether the plant known as "wild turnip" should be placed on the list of noxious weeds. The matter was very fully discussed and members thought it would be advisable to place the plant on the proclaimed list as it was spreading very rapidly. It was also pointed out that plants of Bathurst burr were increasing in number every year, and the view was expressed that the Noxious Weeds Act should be more strictly enforced.

### MIDDLE-NORTH DISTRICT.

#### (PETERBOROUGH TO FARRELL'S FLAT.)

#### BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

November 24th.—Present: 13 members.

**FENCING.**—Mr. B. Giddings, who read a short paper on this subject, said that young redgum timber should be selected for the work. The posts should be 6in. x 4in. at the smaller end, 5ft. 9in. long, with 2ft. in the ground, and placed 8ft. apart. For strainers he preferred posts 7ft. long and 10in. to 12in. in width at the smaller end. As the stability of the fence depended in no small degree on the strength of the strainer, he suggested putting them 3ft. in the ground and strutting them with good pieces of timber. The bottom wire should be 5in. from the level of the ground, the second 11in., the third 14in., and the fourth a barb 10in. above the third wire. The hole for the barb should be about 1in. in diameter, and could be drawn through the posts by attaching a piece of plain wire to one end, and tightened with the aid of a horse. The fifth wire should be 33in. from the ground, and the sixth a barb placed 45in. above the surface of the soil. The wire should be placed on the top of the post and wired to a hole a few inches below. Such would make a six-wire fence standing 3ft. 9in. above the ground. In the discussion that followed members did not agree with the views of the writer. It was thought that the fence was too high, and would be better if droppers were used and the posts placed further apart.

#### BUNDALEER SPRINGS.

October 25th.—Present: nine members and one visitor.

**HANDLING THE WOOL CLIP.**—Mr. P. Kerin, in a paper dealing with this subject, said the first point for consideration in the shearing season was the preparation of the shed. If the stable or barn was used it should be thoroughly swept before the shearing commenced. It was always advisable to provide grating for the sheep to stand on while waiting to be shorn; and it was preferable to yard the sheep from two hours to half a day before penning them up, for if they were run straight from the paddock and crowded into a pen the outside of the wool would be stained. All sheep should be classed in the pen or on the board while being shorn. All sheep cutting light fleeces and wool under 2in. in length should be culled out and marked for the butcher. As soon as the bellies were taken off the stained pieces should be removed and aired in the sun before being placed on the bale. The fleece should be picked up carefully and in such a way that it could be thrown and aired evenly on the table with the outside uppermost. Before the next sheep as placed on the board all pieces should be swept under the table.

When skirting the fleece all stained, seedy, and dirty pieces and matted edges of wool should be removed. The skirtings should be placed on one side and afterwards resorted and classed into first and second pieces. A good discussion followed. Mr. Cooper thought it was not advisable to have too many classes of wool in a small clip.

#### MOUNT BRYAN EAST (Average annual rainfall, 16in.).

November 20th.—Present: seven members.

**THE CARE OF DAMS.**—Mr. R. Thomas read the following paper:—"Before excavating a dam care should be exercised in selecting a site which will minimise the attention required to keep it in order. The site selected should be out of the line of duststorms, as these will help to silt a dam and do injury to the wool of sheep watering at them. Keep out of the centre of a big watercourse, as the dam may have the banks washed away and become partly filled up. Better have it to one side, and a strong bank to carry the stream to dam, so that the flood waters will do no more damage than cut a few gaps in the banks, which can soon be repaired. Ascertain the quality of ground by putting down a hole before excavating. Damp the samples of earth from different depths and mix them into mud. If there is sufficient clay it will become sticky. If it becomes crumbly and free to handle it will probably be a poor holding dam. Also examine the catchment and see what possibilities there are of increasing it should it prove inadequate. If one pays attention to the above subjects before deciding on a site I am sure it will be to his advantage. *Leaking Dams.*—This is very annoying when a dam that was urgently needed proves to be almost useless. Steps should be taken to try and make it hold, and this, as a rule, can easily be done in the summer time. When water runs into the dam put on as many sheep as convenient as soon as possible to puddle the bottom. Keep the sheep on it as long as they can get a drink. Then bring thirsty stock to it and allow them to run through it, afterwards watering them elsewhere. When a dam leaks at the bottom a team of horses or bullocks driven through several times, when there is about a foot of water, will help considerably. Dragging a tree through it may also give beneficial results. If there are patches of pure sand these should be scooped out and good clay put in its place. When there are deep holes in the bottom and all the water has leaked through them, these should be rammed in tightly with good clay. However, a dam generally improves as time goes on, and a dam that is a poor holding one when new will probably give satisfaction later on; but when cleaned out the old trouble may occur again. *Insufficient Catchment.*—This is a common trouble, and in most cases can be very much improved by adding drains. With the aid of a spirit level, and commencing at the head of the old drain or at the dam, one should follow up at a grade of 1ft. or 18in. in 100yds., or whatever is suitable to the country. Care should be taken not to have them too steep, as a gutter or creek may be the result. The drainage system may run into miles, but a medium sized dam with a good catchment is better than a large dam with poor catchment. These drains should be one ploughing, deep and sufficiently wide to carry the water required. The larger the drain the less attention it will require. These wide, flat drains do not wash into gutters as readily as narrow, deep ones. A buck scraper scoop should be used in making drains, as it makes it possible to build a high, even bank. Always be careful to put extra earth at low points. The drains need attention after heavy rains. Washed out gaps should be repaired, and deposits of sand and rubbish removed. A well laid out drain may be very crooked at places, but, the gradients being all the same, the water will run well, evenly, and steadily. *Silted Dams.*—Such dams make endless work, for, as soon as the excavation has been cleaned out, the silting process begins again, so that it is important that this part of the care of dams should never be neglected. Silting is caused in two ways:—(1) Earth and rubbish washing or blowing into dams, and (2) sediment from muddy water. A silt scoop will be found very useful, because when a dam becomes boggy around the edges the wet mud can be removed while water is still in the dam, which makes the batter clean for stock to go into, and also saves waste of water evaporating from several feet of wet mud round the edge of the water. It is surprising the large quantity of silt that can be removed in a comparatively short time. The silt scoop will not do a perfect job, so that when the dams are getting low the opportunity

should not be missed of taking out that which the silt scoop has left. Good work can be done while there is still some water in the dam with a plough and scoop. If rain should fill the dam before it is quite empty it will have been practically cleaned out, and it may be years before it is as low again. *Washed in Dams.*—This trouble is more common than it should be, and a dam in this condition loses a lot of its usefulness. Steps should be taken to remedy it as soon as possible, or the dam will be ruined. Where a dam has no front bank and is washed into gutters, there should be a new batter made by taking out a strip of earth sufficiently wide to remove all the gutters, and the earth used to make a bank along the front. An inlet should be made either along the front or in one of the corners. A dam so repaired should have an inlet built in, or another washout may occur. In my opinion concrete makes the best job. Where a gutter has been washed at the intake there should be an inlet built in. Great care should be taken that the water cannot get under the inlet and wash out a tunnel and cause the work to collapse. Galvanized iron is often used for inlet chutes, and sometimes a temporary repair can be made with brushwood. Wave splashed banks occur when the dam is a large sheet of water and on a flat where the wind has full play on it. In reservoirs broken stone is laid on the inside of the banks, but a log fence with earth and stone packed behind serves the purpose quite satisfactorily with dams. A catchpit is very necessary in front of a dam. It is easier to clean out a catchpit than the dam, and it also prevents the dam from becoming too boggy. It should be so arranged that the flow of water will be checked, thus causing most of the silt to settle before going into the dam. Big dams are often constructed so that water has to pass through a chute, thus allowing water to enter slowly. A very heavy flood will sometimes burst over the bank, so that care should be exercised in the repair or the water will filter through and eventually wash it out again. The sides should be dug down and all lumps broken, and the bottom corners rammed. The gap should be wide enough to allow the team to go through, as they will tread it down firmly as it is being filled. The repairs should be made higher than the old bank to allow for it settling down. Damp earth from the dam will make a good repair, as it will hold better. Evaporation takes away several feet of water every year, and I know of no practical and economical way of preventing it. But by keeping the wind from the water and having the dam in a sheltered place, or building high banks all around the dam, the wastage will be minimised. All wet mud and sand should also be kept away from the edge of water. The best precaution against evaporation is to make the dam at least 12ft. deep." A fine sample of Hunter River lucerne was tabled by the Chairman (Mr. J. Thomas).

#### REDHILL (Average annual rainfall, 16.79in.).

November 2nd.—Present: four members.

**HAY MAKING.**—Mr. G. A. Button contributed a paper on this subject. No hard and fast rules could be laid down for haymaking, he said, but one should use his judgment. The binder should be overhauled and all worn parts replaced. If the crop was self-sown he would commence cutting as soon as the top of the oats turned white; the straw would then be drying at the bottom and be of a yellowish color on the bottom flag. It was better to commence early and have the hay a little on the green side, because a hot, windy day would ripen it off very quickly, and if a large area had to be cut it would get too dry before cutting was finished. Some wheat required to be cut on the green side. If he intended to feed it long in the manger he would cut it when the grain was in the milky stage, because the straw would have more moisture in it; if it was a rank crop it should be cut fairly green, because stock would eat green straw better, and coarse hay cut into chaff was relished more by stock if it was slightly green. Hay for chaffing or sale should be left until the grain was in the doughy stage, because it would weigh better and contain more corn. Oats could be left until nearly ripe; the straw was then of a yellowish color and would not shrink from the bands. If cut too green it had a tendency to be bitter and it was not relished by stock. All hay should be left to ripen for at least three days after it was cut. It should then be made into long, narrow stooks if it was to be carted in before reaping, but if it was to be left in the paddock for some time large stooks should be made and stood up as straight

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as possible. It would then not bleach so much, and any rain that might fall during harvest would run off and not damage the hay. It should be left for at least 10 days in the stooks to dry. If it was stacked before that time it would be liable to heat and fire, or turn mouldy. In building the stack the centre should be kept well filled, so that any rain falling on the wall would run off, and the sheaves should be given a dip outwards. He preferred round ends, because if the stock got in they would not cause so much damage. If the bottom was well filled in the sides would bulge out as the stack settled down and run the water off clear of the bottom. The centre of the stack should be well filled before roofing, and as the eaves were put on they should be dipped outwards to run off the water. He would roof with the bottoms out. A little careful placing and butting would do away with the ridge at every layer. A thick layer of straw should be placed on the top and covered preferably with wire netting, because a single wire would make a hollow and cause the water to run into the stack. The netting could be taken off as required and rolled up. A good discussion followed the reading of the paper.

BLYTH, October 29th.—An interesting discussion took place on stooking hay and farm labor. At a further meeting held on November 26th, Mr. R. L. Butler delivered an address on "Bulk Handling of Wheat."

LEIGHTON November 25th.—Mr. Warnes read a paper, "Stock Feeding," and a lengthy discussion followed. It was decided that the Branch would give a prize of £5 5s. for the best exhibit at the forthcoming Burra Show.

MOUNT BRYAN EAST, October 2nd.—Mr. J. Thomas, who represented the Branch at the Annual Congress, gave a report of the proceedings of the gathering. At a further meeting held on November 4th the Chairman (Mr. J. Thomas) read a paper, "The Advantages of the Agricultural Bureau," and an interesting discussion followed.

NORTH BOOBOROWIE, November 2nd.—An address on "Wheat Growing" was delivered by the Superintendent of Experimental Works (Mr. W. J. Spafford) to a good gathering of members and visitors.

PORT GERMEIN, December 4th.—Mr. A. P. Blesing tabled samples of Sudan grass, amber cane, and lucerne. He spoke very highly of the feeding value of Sudan grass. The cows ate it very readily, and it did not taint the milk, cream, or butter. Amber cane had proved an excellent food for pigs; but the crop had to reach the right stage before it was cut or fed off. When it had been chaffed it made a fattening, sweet fodder. A general discussion then followed on the merits of various fodders.

## LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

CLARE (Average annual rainfall, 24.30in.).

November 2nd.—Present: 14 members.

EARLY VERSUS LATE CULTIVATION FOR THE VINEYARD.—In the course of a paper dealing with this subject, Mr. C. Neate said it was not his intention to lay down any hard and fast rules as to when the land should be worked, because so much depended on climatic conditions and the nature of the soil. During the first four or five years of his residence at Stanley Flat he was anxious to get the garden worked every year; often doing the first ploughing in June, and then immediately working the harrows. Ploughing was again carried out in September, and the harrows run over the land to keep the soil as free from weeds as possible; but experience had since shown him that, besides doing a lot of unnecessary work, it was better to defer working the land until later in the season. When the ground was ploughed in June or July it became so beaten down with the rain that, in order to have it in good tilth for the summer months, it was necessary to plough it over again during the month of September or October. That practice resulted in the loss of a fair portion of the crop through frost. It was also observed that the ground could not be worked down to that nice friable state which was so necessary to conserve the moisture during the summer. The practice he now adopted was to plough the vineyard about



the last week in August, for by that time there was generally a good growth of weeds to turn in, and they assisted in keeping the soil in a good state of fertility. After the harrows had been used the land was not touched until November, when the cultivator was brought into operation and the earth thoroughly stirred up. After every rain the land was worked with the cultivator in order to keep the surface free from weeds and to keep a good loose mulch on top to conserve the moisture. In the discussion that followed, Mr. J. Butler considered it was advisable to allow the land to be in its rough state for a time after ploughing and before harrowing to enable the soil to become thoroughly aerated. Mr. Nolan said it was a very debatable point as to whether escaping a frost was due to non-cultivation. On the river settlements they irrigated and cultivated immediately after ploughing, and they did not suffer from the frost or black spot to the same extent as the growers in the Clare district. Mr. Neate said that he was convinced that cultivation assisted frost to do the damage. On one occasion he had run the harrows through a couple of rows of vines in his vineyard, and that night there was a frost, and those two rows of vines were the only ones burnt. Mr. Dux stated that he did not harrow his vineyard immediately after ploughing, but did so after all fear of frost was over. He gave an instance of where a late frost had cut his vines only in the places where the land had just been cultivated. He only ploughed his garden once in a season. Mr. Hunter advocated ploughing in September, when there would be a good growth of weeds to turn under as green manure. In regard to manuring, he said that he used 1½ cwt. to 2 cwt. bone super per acre last year, and had obtained an excellent crop. Mr. Stacey stated that he was spraying his vines with the following strength of bordeaux mixture:—Bluestone, 6lbs; lime, 4lbs.; and 70galls. water; and it appeared to be checking the ravages of black spot. Mr. Neate said he was using the following strength with equal beneficial results:—Bluestone, 4lbs.; lime, 4lbs.; and 40galls. water.

#### NANTAWARRA (Average annual rainfall, 15.90in.).

November 25th.—Present: seven members.

**CEREAL CROPS.**—In the course of a paper under the heading, "Cereal Crops as a Means of Increased Production," Mr. F. J. Sutton said in most years a payable crop of oats or barley could be sown on land that had carried a crop of wheat the previous year. One of the paddocks of his farm had grown a crop of wheat last year that had been cut for hay. In estimating the value of this year's crop he intended, for the sake of argument, to base his calculations on the insurance values for hay and the market prices for grain. The oat crop cut for hay could be valued at £4 per acre, and barley, 16bush. to the acre at 5s. 3d. per bushel, £4 4s. per acre. The oats harvested 26bush. to the acre, and were worth 1s. 10d. per bushel, equal to £2 7s. 8d. per acre. The crop was sown in May and was fed off short, and that in his opinion was a very payable method of treating a stubble paddock, because of the amount of grazing feed that was obtained at a time when other stubble feed had not made very much growth.

**TAKE-ALL.**—Mr. Sutton also contributed a paper on this subject. He said as the straw left after harvesting an affected crop was the most likely means of infection, the first step in the eradication of the disease should be the burning of the stubble. Much of the affected straw would be destroyed, and in places the heat caused by the fire would kill the underground spores. As the fungus had been found on many of the plants found growing on the wheat producing areas, the proper working of the fallow and the destruction of weeds would tend to reduce the spread of the disease. The first method of checking the take-all, i.e., the burning of the straw did away with the fault of ploughing rubbish into the soil. The burning of the straw was a wrong practice in any system of farming, particularly so in districts where organic matter was burnt up by the bare fallowing of the land. The operation should be carried out when the land had been cleared of its natural growth, when the take-all disease had been prevalent. When the disease had been checked the waste of organic matter due to the burning should be replaced. He believed the farmers themselves could do much towards minimising the extent of the damage, but a good deal depended on the mechanical condition of the soil. The ideal seed bed for the wheat plant consisted of soils that had been ploughed and worked, so that there

was 2in. or 3in. of loose surface soil, with the subsoil firmly packed together. He believed that deep and late fallowed land had much to do with the damage caused by the disease. If climatic conditions did not permit of the land being worked early, and when the soil was open in character, a very considerable benefit would be derived by the use of a heavy roller for compacting the soil. The speaker firmly believed that the thorough working of the land, and the growing of oat crops after wheat, would do away with take-all, and at the same time be a means of increasing the production of the farm.

#### WATERVALE (Average annual rainfall, 27.17in.).

November 1st.—Present: six members.

**BLACK SPOT.**—Members reported that black spot was very prevalent in the orchards of the district. Mr. Burgess stated that during the previous season he had checked the ravages of the disease by spraying with a 1 per cent. solution of bluestone mixture. Other members reported failure on the part of the spray to check the spread of the disease.

#### LONE PINE.

November 23rd.—Present: 19 members and two visitors.

**HAYMAKING.**—Mr. M. E. Minge contributed a short paper on this subject. A tangled crop, he said, was difficult to cut with the binder, but a good method was to run a horse rake in front of the binder, turning around on the off side; the hay would then fall straight on the platform of the binder. Hay should be cut when the grain was full size, and in the milky stage; it would then show a green color after being properly stockod. A good discussion followed the reading of the paper.

#### MAILLALA (Average annual rainfall, 16.88in.).

November 1st.

**FENCING.**—Mr. H. Temby contributed a paper on this subject. The first thing to consider, he said, was the kind of fence that was required, whether vermin or cattle proof, and the next point was how to erect the fence as economically as possible without lessening its durability and usefulness. As practically all farmers ran sheep as well as other stock on their land the most serviceable style of fence to erect would be one with six wires, five plain wires and a barb wire on top. If the fence was erected a suitable height and the wires spaced correctly, such a fence would be sheep proof as well as strong enough to withstand horses and cattle, although a better cattle fence would be one which had two barbed top wires. Posts were the most important item, and he thought it was cheaper in the end to get a line of big sound posts than to pay less for smaller ones. Mallee, being obtainable in the district, was handier and cheaper to obtain, but he thought that good red gum posts, although more expensive, would in the long run prove the more economical, because they resisted the ravages of white ants. He preferred sawn posts to those which were split for the following reasons:—They were more convenient to handle; white ants would not begin to work so quickly on a smooth surface; they would not catch fire so readily as split posts; and lastly, a line of sawn timber had a much better appearance. For an ordinary farm fence he would use posts 5ft. 6in. long, placed 2ft. 2in. in the ground, making the fence 3ft. 4in. high. If a fence was made too high the wires would be too far apart to be sheep proof, whilst if too low it would encourage larger stock to reach over it. Sound strainers should be selected of sufficient size and length for the ends and corners of the fence. Corner strainers should be stayed up both ways to prevent their giving. They should be placed at least 9in. deeper in the ground than the ordinary posts, and should also be a little higher above the ground, because if the top wire was too near the top of the post it might split when the pin to hold the wire while straining was being driven in. If the hole sunk to hold the strainer was made to fit the post it would not have to depend so much on the support of the stays. There was a difference of opinion as to the necessity for large strainers other than those on the ends or corners. He thought that a longer post was all that was necessary for the inside strains of a fence, because when it had two sets of wires pulling in directly opposite directions there was very little extra strain on the post, but

in fastening the wires around those posts care should be taken to see that half the wires went around it on one side, and half around the other side. If they were all tied on the one side the post would probably split when it became old. The posts should be spaced 12yds. apart with three wooden droppers between. That would be quite strong enough for all farm requirements, and the three droppers would make it sheep proof. For droppers he would use either stringy bark or jarrah, those could be procured from the timber merchants with the holes bored as desired. They should be cut so as to allow about 1 $\frac{1}{2}$ in. to project from the top and bottom wires to prevent splitting, and a dropper 1in. by 2in. wide was quite strong enough. A fence as described could be erected very quickly, and was much cheaper than the old style. When wooden droppers were being used the bottom wire should be kept well off the ground as a protective measure against white ants. He thought a well made wire panel of six wires with one or two droppers affixed, according to length, was very serviceable. Wooden and iron gates had a better appearance and were easier to open and shut, but he found that stock, and horses especially, were more likely to rub and paw at them than at wire panels, and they would soon become split or bent. During the discussion which followed members agreed with most of the points raised, but thought that 12yds. between the posts was too far, and suggested that they be 9yds. apart with two droppers between. Some members preferred iron standards to wooden droppers.

LYNDOCH, November 26th.—Mr. H. J. Apps (Assistant Dairy Expert) attended the meeting and delivered an address, "Milking Breeds of Cattle." On November 27th members of the Branch journeyed to Mount Pleasant and inspected Mr. Melrose's milking shorthorn dairy herd.

LYNDOCH, December 8th.—A special meeting of the Branch was called to discuss the possibility of making a Bureau exhibit at the Tanunda show on February 12th, 1921. After much discussion members agreed to make an effort to collect exhibits representative of products of the district. Mr. E. C. Filsell tabled a tool for cincturing the currant vine.

WATERVALE, November 22nd.—One of the members read the paper given by Mr. H. S. Taylor, of Renmark, before the Annual Congress. An interesting discussion followed, and several members expressed surprise at the large returns received from some of the blocks along the Murray.

WILLIAMSTOWN, November 26th.—The first meeting of the Williamstown Branch was held in the local hall, when the Acting Secretary of the Advisory Board (Mr. H. J. Finnis) addressed the gathering on "The Work of the Agricultural Bureau."

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

MAITLAND (Average annual rainfall, 20.08in.).

November 6th.—Present: 12 members.

CARE OF THE FARM HORSE.—Mr. G. W. Boxall contributed a short paper on this subject. A team that was well fed and cared for, he said, could be relied on for a good day's work. In the busy time of the year the horses should be groomed every morning before they commenced work. If that had been done, he said, there would be less trouble with sore shoulders. Each horse should have its own well-fitting collar and hames, and care should be taken to see that they did not pull too much on the point of the shoulder. During the discussion which followed Mr. Jones said he agreed with the views of the writer, and believed particularly in treating the horse kindly. To overcome the difficulty of sore shoulders he lined the collars with sugar matting, and did not favor using any greasy substance on the sores, but black lead, he thought, would be beneficial. Mr. Pearce said horses should not be worked with sore shoulders. Mr. F. B. Smith said he thought sores were caused by a profusion of blood caused by a change of feed and a short spell; he favored putting an extra horse or two in the team.

**MOONTA (Average annual rainfall, 15.22in.).**

November 20th.—Present: 11 members.

**ROAD MAKING.**—Mr. T. G. Cliff contributed a paper on this subject. A road destined for heavy traffic, he said, required to be laid out and constructed with greater care and on different principles from those necessary for a road on which the traffic would be light. A road with a coating of gravel would do for light carts and other vehicles. Eight inches or ten inches of broken stone laid on the natural soil would answer where the traffic was not considerable, but where it was great and heavy the road required to be as solid and hard as possible, to allow the load to be drawn on it with as small an expenditure of tractive power as possible. In hilly country a gradient of 1 in 35 was found by experience to be just such as would admit of horses being driven with safety when descending as fast as they could trot. A wide road would wear better than a narrow one, because in the latter the traffic was confined to one track, while in the former it was spread more equally over its surface. The road should not be curved too much, because the traffic would then be driven in the centre. In making a road provision should be made for drainage. On each side drains should be constructed of sufficient capacity to receive and carry off all the water that would fall on the road. A good bottom of rough stones set with their broadest face downwards was necessary, and the spaces filled with stone chips well rolled in, so that the earthy bed of the road could not be pressed up to mix with the coating of broken stone, which should consist of from 6in. to 8in. angular stones of 2½in. gauge. That coating, when rolled and consolidated, would form a solid and uniform mass of stone. On all main roads, where heavily loaded waggons were constantly travelling to and fro, the proper degree of strength which such a road should have could not be obtained except by forming a foundation with large stones set as a rough pavement with a coating of at least 6in. of broken stone laid upon it, and properly rolled and consolidated. During the discussion which followed, Mr. T. H. Hooper thought it would pay to construct the roads with concrete. Mr. Middleton thought there should be more attention directed to rolling, and the formation of all roads should be passed before the metal was put on. Mr. Ferguson maintained that all roads should be wider than 14ft. or 15ft., and thought if the best materials were used they would stand for 8 years or 10 years. Mr. A. W. Wearing favored either concrete or wood blocks. Mr. C. H. Martin thought that when roads were to be repaired they should be ploughed up and 6in. or 8in. of metal rolled in.

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**WESTERN DISTRICT.****BUTLER (Average annual rainfall, 16.61in.).**

November 23rd.

**DESTRUCTION OF FOXES AND RABBITS.**—In a paper dealing with this subject, Mr. J. G. Parker said the most effective method of destroying foxes was by poisoning them with strychnine. From the beginning of May until about the end of July, he said, they could be easily poisoned, but for the remainder of the year it was only occasionally they would take a bait. He attributed that to the fact that there were usually plenty of rabbits, birds, and eggs, which they preferred to baits, which got stale so quickly. In the warm months the method he adopted was to prepare six or eight baits of fresh meat, preferably liver, each about the size of a match box, then, with a sharp knife, a cut should be made slantways through the bait, and as much strychnine inserted as would lie on a threepenny piece, care being taken to see that no strychnine was left on the outside. Small birds, such as sparrows or parrots, also made very good baits, or fowls' heads, when available, but in the last case he would place the poison well down in the throat. After preparing the baits, which should be carried in a tin, a trail should be made in the sheep paddock by dragging the lungs of a sheep or pig over the ground, and the baits placed at intervals of five chains or six chains. Mr. A. H. Pfitzner then spoke on the destruction of rabbits. February, he said, was the most suitable month for poisoning rabbits. The best method, he thought, was the use of phosphorus mixed with pollard and sweetened with sugar. That could be laid either by the use of a poison cart or in furrows around the burrows and in the scrub. It was necessary that all warrens should be destroyed. He had found

covering the holes with wood, burning, and placing the hot coals in the burrows, and covering them with soil, a sure method of destroying the vermin. He also advocated ploughing up the burrows as often as possible. An interesting discussion followed.

GREEN PATCH (Average annual rainfall, 26.56in.).

September 27th.—Present: 12 members and several visitors.

WOOLCLASSING.—The monthly meeting of the Branch was held at the residence of Mr. F. H. Provis, where a discussion took place on the subject of "Woolclassing." Mr. T. Proude was of the opinion that the man who skirted his fleeces did not get sufficient price for the extra trouble. The Secretary (Mr. R. L. C. Sinclair) thought it would pay to class an even clip properly, and strongly advised members to do so. Mr. Provis agreed with the views of the Secretary, and he thought it would certainly pay to class an even clip. Mr. Provis then invited the members to his wool shed, where shearing was in progress. The stud sheep were examined, and members congratulated Mr. Provis on his good, even flock. The milking machine was then inspected, four cows being milked at the one time, and members took great interest in the milking and separating in one operation.

GREEN PATCH (Average annual rainfall, 26.56in.).

November 22nd.—Present: seven members and one visitor.

HOMESTEAD MEETING.—The monthly meeting of the Branch was held at the residence of Mr. C. J. Whillas, when Mr. Proude gave an interesting account of the Congress held in Adelaide during September. The Chairman (Mr. E. Chapman) also gave an account of his visit to the Murray River during show week. Mr. Parker said that during September he sowed a crop of rape and rye, mixed at the rate of 3lbs. of rape seed per acre to three bags of rye to 20 acres, and was grazing the plot to his cow, and was securing excellent results.

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## TO ADVERTISERS.

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## MILTALIE (Average annual rainfall, 14.55in.).

October 23rd.—Present: 11 members.

TRACTOR VERSUS HORSES ON THE FARM.—Mr. D. P. Bagnell contributed a paper on this subject. The initial cost of the tractor, he said, was a big item, but there were many points in its favor. If the tractor would take the place of 12 horses for drawing ploughs, &c., the farmer could dispose of his team and run enough sheep or cattle on the portion of his farm that was reserved for his workers to pay the price of the tractor. Breeding sheep and cattle would bring a larger revenue to the State than horses. If three or four wet days occurred in a week, with 12 horses in the stable, they would be eating a large amount of the profits, whereas a tractor would cost practically nothing, and the money spent on feed for 12 horses would help to maintain the tractor. There was also less risk attached to the working of a tractor, and it could be used for driving the chaff cutter, header, and thrasher, and would thus save the expense of a stationary engine. Sufficient horses would have to be kept to cart wheat to market, because a tractor was not suited for that purpose. During the discussion which followed, Mr. J. S. Jacobs said the tractor was more suitable than the horse in many ways, especially where the rainfall was light, because it could work longer days and plough more ground whilst it was in a ploughable condition. The Secretary thought the tractor would in time take the place of horses, and the difficulty of carting to market would be overcome by the use of lorries. Mr. H. Degner thought the tractor would have to improve before it could take the place of horses on the farm. Mr. J. P. Story said that if a tractor was kept the number of horses could be reduced and more sheep and cattle kept. Mr. O. Degner thought the cost of the fuel consumed by the tractor would exceed the cost of the feed eaten by the horses to do the same work. The Chairman (Mr. A. M. Wilson) thought that the idea of using the tractor for farm work should be encouraged, and gave his experiences of what he saw in England and France. The delegates to the Adelaide Congress, Messrs. P. J. McEachen and O. Degner, then gave a lengthy report of the proceedings. •

## ROBERTS AND VERRAN.

October 28th.—Present: seven members.

HAYMAKING.—Mr. H. Videon contributed a paper on this subject. Oats, he said, served as a rotation crop, which was absolutely necessary in that district. It had a stimulating effect on the animal system, and chemical analysis proved conclusively its superiority over other cereals in feeding value. Much of its good quality, however, could be impaired by cutting when the crop was a little too ripe. Both oats and wheat were richest in nutrients when cut in the bloom stage. A heavier tonnage would result if the crop was cut a few weeks later, but the hay would not be so good from a dietetic point of view. The plant at that stage matured quickly and transferred the starch from the leaves and stems to the grain. The time of stooking depended entirely on weather conditions, but two days from cutting was the usual time. He advised making rather large stooks with the heads protected as much as possible and arranged to run off the rain. After the stooks had been in the paddock for two weeks the hay should be carted into the stack. During the discussion which followed Mr. W. Sharman said he would let the crop get a little further advanced than the stage mentioned by the writer of the paper, and he would stook immediately after cutting. He considered that the hay would be ready to cart in about nine days if the weather had been fine. Mr. C. Kunst favored letting the corn in the crop start to harden before cutting, because he thought that green hay was inclined to scour the horses, and he would stook the sheaves six hours after binding. Mr. A. J. Drayton preferred cutting the hay when it was slightly green; at that stage there was a distribution of nutriment throughout. Mr. A. T. Cowley favored building the stack high and narrow, because the waste would not be so great. He would build with the butts out first round, then lapping the inner rows with heads outwards up to the band of the other sheaf.

## SALT CREEK.

October 30th.—Present: seven members and two visitors.

**COLT BREAKING.**—Mr. Gale contributed a short paper, which was read by Mr. L. Guidara. The writer said the best plan to adopt when handling a young horse was to first run it into a small yard and catch it by casting a rope around its neck. The animal should then be rubbed down until it was quiet enough to allow the halter to be fixed on. The mouthing of the colt was a very important part of the breaking in, and a good deal of care should be taken when the work was being carried on. A surcingle with a ring on each side should be buckled on, and a short rein attached to one side of the halter sufficiently tight to make the horse walk around in a circle. After the rein had been on for a couple of hours it should be shifted to the other side of the bit. When each side of the mouth had been treated a long pair of reins should be put on and the colt driven around and taught to guide. A good plan to teach the colt to lead was as follows:—Obtain a light rope, make a large loop in it and throw it over the breech of the animal, bringing the knot up on the middle of the back, and then pass the ends through the rings of the bit. All that was necessary to make the colt move forward was to give the rope a sharp pull. Finally the young animal should be harnessed with old horses and then take his place in the team.

YADNARIE (Average annual rainfall, 14.09in.).

November 22nd.—Present: nine members and three visitors.

**QUESTION BOX.**—The monthly meeting of the Branch took the form of a "Question Box." In reply to a question from Mr. W. E. Hier as to what was the best oil for harvesting machinery, Messrs. Forbes, Spriggs, and Kruger unhesitatingly recommended good castor oil. Several other subjects dealing with stock troubles were brought forward and discussed.

**CLEVE,** November 25th.—Consideration was given to the formation of a Field Trial Society in the district and Mr. L. E. Cowley was elected Secretary *pro tem*.

**MILTALIE,** November 27th.—The meeting took the form of a "Free Parliament," when several subjects of local importance were brought before the members for consideration.

**SMOKY BAY,** November 20th.—The programme for the coming year was discussed, after which the Secretary read an article on haymaking. Mr. Lovelock tabled some samples of the Canberra variety of wheat.

**TALIA,** November 27th.—A long discussion took place on African boxthorn, which was grown in many places in that district as a hedge. The question of grass seeds being a danger to sheep also received attention.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES).

## BRINKLEY.

October 30th.—Present: 14 members.

**BALANCING HORSE AND MAN POWER ON THE FARM.**—In the course of a paper dealing with this subject, Mr. W. Pearson said it was necessary to consider the question from three viewpoints—horses, men, and machines. Horses were of first importance, because they were the basis on which the number of men and machines required would be employed. It was obvious that in every case the area to be cultivated would be determined by the number of horses available. During the past 10 years he had closely watched the operations of a 1,000 acre farm, and had come to the conclusion that the upkeep of the horses was the most expensive item on the farm. That statement might at first be considered a very strong one; but the following facts would be found to bear out that declaration. The lowest estimate of rearing a colt up to the age of three years was £20, and if the maximum results were to be obtained, the horse had to be liberally and judiciously fed and cared for, which, in the course of a year, would amount to a sum between £25 and £50. When the prices of beef, mutton, and wool were considered, and that one horse was equal to about eight sheep in the amount of fodder consumed, it

would be observed that even if the horses were idle and being depastured, the amount of their upkeep would be a considerable expense. The average working period of the horse would not exceed 10 years, and with the initial cost at £20 for the colt at three years old, and maintenance for 10 years at 10s. per week, the total for 10 years would be equal to £60. In addition to that, a minimum of £10 should be set aside for shoeing, harness, extra labor, and possible losses. With an area of 1,000 acres to be farmed, 20 horses would be required, so that for 10 years the keep of the horses would amount to £5,800. It was obvious, therefore, that they should be made to earn as much as possible, and in order to do so the necessary implements and proportionate number of hands would have to be employed; consequently if the man power or implements were not adequate to the demands, the horses had to be idle. He contended that the resultant loss was the same, whether men were idle for the want of horses, or horses idle for the want of men to work them. The earning power of a good team of horses, driver, and an extra man during the past few seasons, when engaged on such work as wood carting, was from £25 to £30 per week. He believed that many operations, such as rolling and harrowing growing crops, snagging and clearing up roots, were too often neglected on the majority of farms. Another point that was very often lost sight of was the value of setting aside an area of the farm for the growing of fodder crops for the stock. It was quite reasonable to state that a day's work on the farm was equal to a day's carting away from the farm. The latter could be set down at £3 per day, so that if the team was employed for the 100 days of the year that they too often spent in idleness, they would earn £300 per annum. That would pay the wages of two men for 12 months, thus providing two additional hands to work on the farm for eight months or nine months free of cost. The possible earning of a team's labor was six times that of the farm hand, therefore it followed that if the team was idle for a day when there was work to be done, the loss would be equal to that of six men being idle, i.e., a direct loss of £3 per day. The question was often asked, "Does it pay to harrow before and after the drill, and to harrow and roll the growing crop?" but in estimating the cost the fact was overlooked that the most expensive item, i.e., the horses, were already to hand, and they had to be paid whether the work was done or not. In reality the only additional expense was the men's wages. If the land was harrowed and rolled the hay could be cut at least 3in. lower, several mere hundredweights to the acre would be secured, and the harvesting machinery would run more smoothly and lightly. Again, there was no doubt that keeping the horses in constant work kept them in better and harder condition for the heavy work of the busy seasons of the farm.

#### BRINKLEY.

November 27th.—Present: 13 members.

PREVENTING SANDY SOIL FROM DRIFTING.—Mr. R. J. Lemmey contributed a short paper on this subject. An experienced farmer, he said, would plough sandy soil with a disc plough, and not touch it till seeding time. If there were any weeds growing on it he would put a few stock on it, but not too many. At seeding time, after the rains and when the weeds were beginning to grow, operations should be commenced with a tandem disc or harrows tied one behind the other, and followed by the drill, but he would not harrow after. During the discussion members thought that the sand mostly drifted over the top and did not blow out in holes. Mr. Pearson thought that so long as light soil was fallowed it would drift, and said it would pay to grow crops for grazing purposes and not for grain, if the land was clean enough. Fallowed land should not be touched at all until seeding time, and then sown early, because it would give the plants a chance before the winds came.

#### COONALPYN (Average annual rainfall, 17.49in.).

November 26th.—Present: six members and two visitors.

SHED BUILDING.—Mr. F. Pitman, in a short paper dealing with this subject, said in selecting the uprights for the shed one of the forked ends of the poles should be left about 15in. longer than the other, so that there would be sufficient timber left on which to bolt the rafters for the iron. Light sticks should then be laid across the rafters to carry about 6in. of straw. If the iron



was erected about 2in. above the straw space would be provided for ventilation, and cats could get into the straw to kill mice and birds. Many people advocated a straw roof because it was warm in winter and cool in summer, but the speaker believed that the roof described in the paper would be comfortable and waterproof, and last for a considerable number of years. If the straw was dipped in a strong solution of lime and water the mice would not do very much damage to it. Another advantage of the iron roof was that it provided an excellent means of conserving water. For the walls the speaker suggested stone or concrete, but if that was not possible iron could be used for the purpose. In the discussion that followed members thought the provision of a double roof an unnecessary expense.

#### MERIBAH.

September 22nd.—Present: nine members.

DESTRUCTION OF MALLEE SHOOTS.—Mr. W. E. Jones, who contributed a short paper on this subject, expressed the opinion that the best method to adopt when a start was made to destroy shoots on newly cropped land was to cut the mallees with the slasher during the month of July. If the crop yielded a good growth of straw the stubble should be fired at the first opportunity, and if a good burn was secured he believed one would have destroyed at least 50 per cent. of the shoots. If the straw was not thick enough to carry the fire one should resort to the fire rake. Mr. Symonds, in opening the discussion, voiced a preference for the use of the fire harrows in that district, but there was no doubt that there was nothing to equal a good running fire. By logging down the straw before burning Mr. Hank believed that a good burn would be practically assured.

#### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

November 20th.—Present: 11 members and two visitors.

HARVESTING.—The Hon. Secretary (Mr. C. F. Altmann) contributed a short paper on this subject. The machine, he said, should be carefully overhauled and all worn parts replaced; little trouble would then be experienced in the field. For wheaten hay, he preferred cutting when the grain was rather hard; if it was cut when green more would be required, because the nourishing parts were soft. It should be cut while the straw was still green, because if it was too ripe it would be of less feeding value. For oaten hay he would cut the oats about 10 days before stripping. Green oats were too bitter, and horses would not eat it readily. Wheat should be properly ripe before being stripped. He preferred the harvester, it being cheaper and quicker. With a 6ft. machine and one team of horses 10 acres a day could be averaged through the season. The stripper at its best would only take the wheat off, and leave it in the chaff to be cleaned later. Two men with a complete harvester would have the wheat from 200 acres ready for carting in 20 days or less, which was quite impossible for two men with a stripper and winnower; and speed, he said, was the main factor in our changeable climate. During the discussion which followed, one member said that the harvester was the cause of the weevil trouble; but the writer pointed out that green wheat was the chief trouble, and wheat should not be taken if green.

#### RAMCO.

October 25th.—Present: 19 members and three visitors.

CINCTURING.—“The objects of cincturing are to check the flow of sap to allow the fruit to set and to help enlarge the berries,” said Mr. E. Burroughs in a paper under the above heading. As a rule he usually performed the operation when about 90 per cent. of the flowers were showing, although one should also take into consideration the condition of the soil. If the soil was somewhat dry, a heavy rain or irrigation would probably cause the berries to fall, and in that case it would be necessary to do the cincturing without any loss of time. One of three methods of cincturing was usually adopted:—First, making two cuts with a knife,  $\frac{1}{2}$ in. apart, around the stem, and then removing the intervening piece of bark. The speaker did not think that a very good practice, because it made too large a wound. The second method was that of running a knife around the stem and twisting the blade from side to side so that the bark

would be lifted. The disadvantage of that procedure was that with a single incision the edges of the bark were left too close together, and when the wound healed it left a thick ridge on the stem of the vine. A blunt, fine-tooth saw he considered the best for the work, as it only took out a narrow strip of bark and the wound healed evenly. A very handy tool for the work could be made by filing down the edge of an ordinary table knife and then cutting teeth in it. Such a tool, used in the same manner as a saw, would not tear the bark or make too deep a cut into the stem. An interesting discussion followed, in which members agreed with the views of the writer of the paper. The report of the delegates to the Annual Congress was also received and discussed.

#### RENMARK (Average annual rainfall, 10.93in.).

October 20th.—Present: 40 members.

CARE OF YOUNG TREES.—The following paper was read by Mr. H. F. Levien:—  
*Planning out the Property.*—Before attempting to lay out a property for trees, the character of the soil, subsoil, drainage, and irrigation system must be taken into consideration. The soil and subsoil differ so much on any given area that it becomes impossible to give certain and definite instructions. Each area must be considered on its merits. Provision should be made for the house site, the house garden, stable, and shed room, and for a drying ground and racks. Preferably all sheds should face the east, or north-east, being protected as far as possible on the southern side. New settlers in the Sunraysia district have an advantage over those in many other fruit-growing settlements now being established, as they have as neighbors men who are engaged in commercial dried fruit growing, which has passed the experimental stage, and with an unlimited market for their products. Growers in the future will only require to follow a lead already set. The planting of the future in these districts, so far as trees are concerned, will be of apricots, peaches, nectarines, pears, and, in a lesser degree, almonds and olives, among the deciduous trees, and more attention will be given to the planting of citrus of exportable sorts. *Laying out the Orchard.*—One of the first things to be considered is the question of headlands, and in determining this question it is as well to take into consideration the size to which the trees will grow and the space they will cover in full bearing. No headland should be less than 24ft. If room at the headlands is given to allow a two or three horse team to be used with the implements there will be few broken branches, and when the trees begin to produce it will be much easier to have plenty of room to turn the farm waggon on a 24-foot headland than one of a lesser size. There are two methods of planting trees usually chosen—the square and the septuple or equilateral triangle system. The latter system have much to recommend it in large areas, but on the average property the square system is undoubtedly the better, and of later years it is being generally adopted. It has the advantage that the trees are in rows at right angles, and at equal distances apart. Angle cultivation may be given when the trees are young, and though it becomes almost impossible in later years to cultivate more than two ways, this is generally considered sufficient for the necessary stirring of the soil and to keep down the weeds. In the original plantings in Renmark rather a hard and fast rule was adopted in the matter of distance apart, at which the older orchards were planted. It is rare to see trees any closer, or more distant, than 24ft.; and the general rule was to plant on the septuple system. One cannot help noting the difference in the older orchards. Whilst 24ft. apart seems to be a correct distance for some trees on some land, it is either too much or too little on others. The size of the trees will vary in different soils, and at the same time the different varieties of the one sort of fruit tree will show a remarkable variation in the size they ultimately attain. Close planting is to be condemned for reasons that are obvious, whilst if trees are planted too far apart there is waste of land. No fixed rules can be laid down; but an instance can be given. The Moorpark apricot is a sturdy, upright grower, attaining an average size, whilst the Blenheim—the best canning and drying variety known, I venture to say—has a more slender growth; the tree later on assumes a somewhat wider and more willowy top, and in comparison would require, on average deep soil, to be planted at least 4ft. wider apart than the Moorpark apricot. The Blenheim is known in New South Wales, and is catalogued by the nurserymen of that State as the Trevatt, due no doubt

to the fact that Mr. W. J. Allen, New South Wales Fruit Expert, noting the excellence of the Blenheim grown in Mildura by Mr. Trevatt, secured the buds from that grower. This is mentioned also as an instance of the way the names of the same variety of fruit may be altered in different States. *Distance Apart.*—Taking typical Renmark soil, the following distances may be given. Except in the very heaviest and stiffest land they should not be less; whilst on the loose, free soil, and with the consideration of the different growth of the varieties, the list is given as a basis of comparison only, and not as a set rule.

	Trees.	Square. ft.	Septuple. ft.
Apricots . . . . .		22	24
Peaches . . . . .		22	24
Nectarines . . . . .		19	22
Plums . . . . .		19	22
Pears . . . . .		17	22
Lemons . . . . .		24	28
Mandarines . . . . .		18	21
Oranges . . . . .		22	24

It may be of interest to complete this information by giving the different numbers of trees which are required to plant an acre by either system.

Square System.		Septuple System.	
Distance Apart.	Trees per acre.	Distance Apart.	Trees per acre.
ft.		ft.	
30	48	30	55
28	55	29	60
26	64	28	63
24	75	27	68
22	90	26	73
20	100	25	80
19	120	24	86
18	134	23	95
17	150	22	103

The lemon in free soil will make very strong growth, and large trees may be expected. In some soils 30ft. will not be too close to plant these trees. The naval orange is of a spreading type, whilst the late Valencia is of a more upright habit. Mandarines grow into small, upright and compact trees in average soil. It would be folly therefore and waste to give them the space that one would devote to an olive tree, for instance. *Selecting the Nursery Stock.*—Having decided the variety of fruit which is to be planted, the next consideration will be to get the trees. Too much importance cannot be given to the selection of trees. It has become the custom to obtain tree from some reliable nurseryman and not produce them on the orchard, except when the settler is engaged in the business in a very big way. The nursery business has become the work of specialists, whose reputation has been built on the supply of good trees. And those older established firms are jealous enough of their reputation to supply only trees correct to name—trees budded on the proper stock. In past years disappointment and failure have been caused by the supplying of trees not of the variety advertised or required, and apart from the question of loss of time and fruit, a rebudded deciduous tree can never give the same results as a correctly worked and planted tree allowed to grow unchecked from the commencement. There is no redress, and it is clearly the only safe policy to deal with a firm with the reputation of years in business. Trees are produced by the budding or grafting of the selected variety on seedling stock. With the particular trees planted in these districts, budding is the accepted method of propagation; grafting is more practised with apples and pears. The stone is planted, either in the autumn or spring, and it usually takes about two seasons to get a tree ready to plant out in the orchard. The stock is budded when about  $\frac{1}{2}$  in. in diameter. The bud throws out the shoot which is ultimately to become the tree, the seedling stock above the bud being gradually reduced

to the level of the bud, as the bud knits and commences its growth. The production of citrus trees takes longer; nurserymen are not able to send out a tree fit for planting until about the third season at least. The seedling stock has a large influence on the tree. A strong rooting stock will produce a good tree, whilst a weak stock will have a correspondingly weak top. Deciduous trees are better worked on their own roots—that is an apricot tree of a selected type is budded on a seedling apricot. The union between the stock and the bud is better; the tree does not outgrow the stock, and *vice versa*. Peaches may be budded on almonds, and even apricots on almonds—I have seen both. But sooner or later ill-effects will be produced, and this point should be stressed because often nurserymen may have a demand for one variety of tree, and not having enough of that variety on hand, and not wishing to miss a market, may be tempted to bud simply to produce a selling tree without any regard to the future. This applies to the type of tree seller who will be found advertising a "cottage selection of trees of varieties at per dozen." The production of trees could be well undertaken in this district by those having a private pumping plant, or facilities for watering a little more frequently than the ordinary rotation water supplied to irrigators in the district, and it is a profitable business. *Time of Plant.*—Careful planting, regular cultivation, and proper pruning and spraying make towards success in the life of a tree. Deciduous trees may be planted from early in June to the end of August. But in the irrigation districts, where it is proposed to water at time of planting, later planting may be done to fit in with the spring irrigation. With such an extended time for planting there can be no excuse for a hurried or careless job. Citrus trees do best when planted early in August, or they may be planted in new, warm land in April, but in this case they should be protected by covering through the winter. August planting is to be recommended and has given the best results in these districts. A great deal depends on the way each operation is carried out. Dealing first with deciduous trees. On receiving the trees from the nursery, in the first place unpack at once and heel them in carefully, avoiding undue exposure of the roots. This operation is done by digging a trench and putting in the trees singly, or in small handfuls, taking care the roots are covered well with loose earth. If the roots are dry drench them with water before heeling them in. The site chosen to heel in the trees should be in a cool, moist spot. Do not let the trees stand in water, as is often done; they get trench feet, even if left for a few days. The usual way is to choose cool, damp soil, taking care to exclude the air. *Pegging out the Orchard.*—The pegging out process is simple and has been so often dealt with that it is not necessary to repeat the directions here. Assuming, however, that the pegs have been placed in the position where the tree will ultimately stand, the use of the planting board is recommended. The planting board is made of deal, being 4ft. long and about 4in. wide, having three V or U shaped notches cut in it; one on each end, and one in the centre, the bottom part of the centre cut being in line with the end cuts. The planting board is placed at the peg, the centre



(Planting Board.)

V being placed in contact with the peg; a peg is now inserted in the V cut at each end. The peg in the centre is then withdrawn. The use of the planting board is recommended, and with its use no sighting in of trees is needed. The board enables the planter to hold the tree in position, and at a correct and even height. The depth of planting by this means can be very accurately regulated. The double pegging is better done with the pegs in line, as far as possible, with the slope at which the trees will be irrigated. The holes may now be dug, and need be but little larger than necessary to receive the roots without having to cramp them, and certainly not deeper than required. If it is proposed to follow the planting immediately with the irrigation, furrows can be put in, either before or after the holes are dug; for, unless there is ample labor

available, it is better to make this preparation in advance, and thus save time at the irrigation. *Planting Deciduous Trees.*—When ready to plant it is advisable to remove only a few trees from the earth at a time. Carefully trim the roots and remove any dried out or badly crushed roots, at the same time reducing the top somewhat, as a convenience in handling, but with no attempt at pruning, which is better done later when the trees are in position. It is needless to state that the roots of the trees should not be exposed unnecessarily, and a good plan is to get a few sacks which have been damped, and to carry about a dozen trees in each, having the roots well wrapped up from the influence of the wind and sun. There has always been a difference of opinion as to the depth to which the roots should be covered in relation to the surrounding ground. Every care must be taken to plant the tree no lower than it stood in the nursery, and taking everything into consideration, allowing for a possible setting in the soil, it is safe to plant at least an inch or two higher than the tree stood in the nursery, earthing well up. With the use of the planting board to assist, planting can be done rapidly and correctly. The board is replaced in position by means of the two outside pegs, and the stem of the tree placed in position in the central groove of the board. In putting each tree in the hole and shaking it into position use friable earth, being most particular to have the earth well trodden or rammed about the roots, so that the tree may be quite firm in the soil. In this connection I would like to make a few remarks concerning some elementary information regarding the structure and functioning of trees, as it has an important bearing on the subject and will help those of our younger growers who have not studied the matter to understand how each operation is done and the reason for it. Roots are specially adapted for anchoring the tree to the ground and preventing it being blown over by strong winds. In addition to this they form the channel through which the water and food material enter the tree. The roots may be described and are known as:—(1) Main or primary root, (2) lateral root, (3) root hairs, (4) root cap, and (5) inner tissue. The main or primary root is the root coming straight away, and is described by many as the "tap root"; the lateral roots are those which are formed or come from the main root; and the root hairs are the smaller, slender rootlets which are the mouths and the lungs of the root system. It is just as impossible for trees to grow without air in the soil as it is for the top to flourish without it. Towards the end of a root cap is the growing point consisting of tissues, which are constantly dividing and adding length to the root. The root tip or growing point is covered with a thin layer of cells called the root cap, which protects the tender tip from injury, as it forces its way through the soil. Just behind the root tip constant supplies of root hairs are formed to replace those higher up which have finished their work and have been rubbed off. When a root is broken or cut off, that root cannot grow any more in length, and has lost its growing point. In such a case fresh laterals are produced from the root, or even from the stem. Scientific investigation is now being carried on systematically, and some interesting information is supplied as a result of a series of field trials at the Woburn Experimental Fruit Farm, in England, where some interesting conclusions have been arrived at—the result of proper investigation and records. I would like to quote remarks concerning planting which are as follows:—'When planting in the ordinary way it is essential that the soil be in a fairly friable condition, for when it is wet and sticky, it cannot be shaken in between the roots, and contact between it and these is imperfect. On the other hand, when ramming is adopted, the condition of the soil need not be considered. As a result of experiments it has been found to give better results with wet soil rather than with dry. Firmly planting has been advocated by all horticulturists, but ramming is more than firm planting, it is using the same methods of planting as one would use to plant a gate post. If irrigation is available basin out each tree and fill the basin; and where irrigation is used, commence at the tree furthest away from the supply ditch, repeating the operation at each tree to the head of the row. If no irrigation water is available make a basin round each tree and give it a liberal application of water. By so doing the excess air in the soil is excluded, and the earth round the roots is further consolidated. Excess irrigation is to be avoided at an early stage. In fact it has rather an opposite effect to the general accepted ideas

of the young irrigation farmer. Warmth and sufficient moisture are all that are required. Those who have a knowledge of potting seedling of cuttings are fully aware of the operation of firm planting and excluding the air, by immersing the pot in water; and we are told to put plenty of drainage in the pots, and which would give a free circulation of water and of air. As soon as the surplus water has entered the soil the surface should be well worked—pulverised. This may be done as soon as the soil can be worked without being puggy. *Cutting Back Transplanted Trees.*—As soon as convenient the trees may be cut back. As the trees have had their roots reduced, so the top should be cut back; and it cannot be too strongly recommended to cut the top right back to a single stem for preference, but with the object of having the first branches not higher than the knee. If the tree has been headed in the nursery at a lower height select limbs, either two or three if suitable, coming away from the butt, at spaces of not less than 2in. or 3in., cutting them well back, and avoid the limbs which show a V shaped growth in the main stem, as later on these will possibly break off. With good cultivation, moisture, and fertilising elements in the soil the root system will extend faster than the branches. The tree may be shaped during the summer by judicious training and pinching, removing all growth that is not required, and regulating the growth by frequent and systematic attention to the tree. Hard summer pruning is not recommended—it is to be avoided. When the growth has extended sufficiently to warrant the formation of another branch the shoot is pinched back to the desired length, new shoots will then be formed. The tree will grow right through the summer, and well on in the autumn. All shoots and superfluous growth that are likely to cause a drain on the tree should be removed as soon as possible. *Citrus Trees.*—In planting citrus trees great care is required in the matter of keeping the trees in good condition. Being an evergreen, and having a leaf system to continually drain its vitality, more care is necessary with citrus than would be used in the case of deciduous trees, and a good result can only be obtained by using the greatest care. When an area is to be planted with citrus trees the sooner they are planted after their first removal from the nursery the better will be the result. It is desirable that the land be prepared well ahead of the time it is expected to receive the trees, enabling the planter to get busy as soon as the trees arrive. Citrus trees arrive packed in damp sawdust, or in sawdust and loose earth well mixed and damped, after being well packed about the roots, in a box. The box, having the roots arranged for transit, is usually closed in with hessian to keep the leaves in good condition and protect them from the influence of wind. On getting the packages of trees, if the planting is to be done within a reasonable time, do not remove them from the box, but cut away the hessian covering from the box, and water the trees, lightly spraying the leaves with water, preferably with a small pump. It is inadvisable to over-water, and, provided the sawdust or packing is damp, this is sufficient. *Pruning the Roots.*—The rule with regard to root pruning should be carried out as mentioned for deciduous trees. I am distinctly not in favor of excessive root pruning; this, carried to excess, is the cause of faulty trees later on. Make use of all the main lateral roots, but the dried-out hair roots and fibrous roots can be removed, retaining any rootlets which are showing vigor. We were told by early horticulturists to carefully spread out all fibrous roots. These are quite incapable of producing, even if they live after the drying out they get in the removal. *The Depth to Plant.*—The top should be reduced somewhat to make the tree easy to carry and more convenient to handle in the operations to follow. The planting board can again be requisitioned and will save time, being a decided convenience. Many opinions have been expressed exactly as to what height, above that at which the tree stood in the nursery, it should be planted. In the course of my experience I have seen a very great variation in the planting; but I have never seen success come to the planter who plants low—indeed, with trees so planted, that is planted so low that the union of stock and bud can be damaged by water, collar rot sets in, and the trees soon become a fit subject for the wood heap. As another extreme, I have seen some hundreds of acres of rich alluvial river land planted practically right on the surface. In this case not more than 2in. of surface soil is removed and the earth is built up in a mound, each tree, in its early stages, appearing to be planted on a hill. This system answers quite well in low alluvial, level land, irrigated

by flooding, but for many reasons, which need not be entered into now, it is not a practice to be commended, and all irrigation of fruit trees should be done in furrows. The best height to plant oranges in this district—dealing with land which is moderately level—is to have the nursery ground mark about 4in. higher than the usual level of the land, building up the land to the level with the shovel at once; and later on with the disc and a ploughing or two, the tree will be a correct height. On land on a hillside it is well to take into consideration the natural movement of the soil, both by cultivation and irrigation, and due allowance should be made for the trees at the bottom of a slope, planting them slightly higher than the trees at the top of the slope. *Plant Firmly.*—Citrus trees should be firmly planted, and again I must express my opinion very strongly in favor of a firm planting being more than a gentle pressure with the sole of the foot, but rather a complete ramming of the soil with the heel of the boot of a rather heavy man, or with a rammer. Each tree should get a bucket of water at once, or the planting be followed up immediately with a basin irrigation. As soon as the surface is in a condition to pulverise it should be reduced with a fork hoe, making a fine mulch of the soil. *Trimming the Top.*—Trees newly planted should never be allowed to retain the 'head' as they are sent out from the nursery. Cutting back is essential, the aim being to assist the tree in developing new branches. Having the roots reduced the top must be reduced accordingly. A well developed branch system is essential, and the sooner this is aimed at the better. Citrus trees have a tendency to grow low, and the main stem should be at a reasonable height. It has been the practice for some cultivators to aim at the first branch being at least 3ft. high; this, however, is unnecessary. The main stem should be a little higher than the knee, and the branch system can be developed on defined lines in a similar manner to the deciduous trees. *Protect the Stem.*—In this hot climate, and until the tree has developed sufficient head to act as a protection to the stem, protection should be provided, more especially in sandy land, or land which blows. This can be done by placing some protecting material round the stem. Several suggestions may be made, but straw bottle envelopes cut down the side and tied lightly round the tree make an excellent protection. Funnels made of brown paper have stood over a year, and if oiled they will stand quite a time. At a pinch, strips of hessian may be fixed about the stem in a similar manner to the way putties are put around the leg, but it will be necessary to continually watch these bandages and keep them loose. This system is not recommended, and only when forced should close wrapping be adopted. *Training the Tree.*—During the early growth of the citrus family shoots appear on the stem—water shoots sprout where they are not wanted—and this is particularly noticeable after an irrigation. Therefore it is necessary to give frequent attention to the trees. If the unnecessary growth is rubbed off, or cut out at once, rubbing or breaking off being easily done when the growth is young, the energy and growth of the tree will be directed into the branches which are required. It is not an uncommon sight to see a water shoot ultimately taking the place of the tree. If the trees are properly attended to in the early stages and an upward growth encouraged, paying due regard to the shape of the tree, heavy pruning and cutting will be avoided later. The centre of the tree should never be allowed to become crowded. *Filling the Misses.*—Citrus trees are more difficult to transplant than deciduous trees. It is not unusual to find a considerable number of misses at the end of the first year. If many misses occur the same attention must be given to the replanted trees as was given to the original planted tree. It is wise therefore to take every precaution and make provision for replacements, which may be estimated on the high side at 10 per cent. When ordering trees procure only the very best trees for the permanent positions in the orchard, the remainder being planted in a nursery row, 15in. apart, where they can get the same care and attention as those planted out, reducing the tops as is necessary when any replanting is undertaken. The trees can be put out in their permanent position in the autumn or spring, suffering but little check, if the following simple method is followed. With a sharp spade cut the earth away from each side of the row, leaving a solid block the length of the row. This block may, just before the removal, be tapered and trimmed off somewhat. Then with a sharp saw, cut between each tree and the block containing the tree may be simply conveyed on a bag or board to the permanent position. This is an excellent plan, and any trees on hand over and above the

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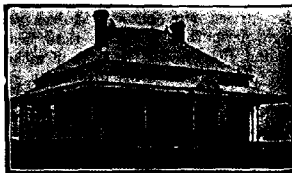
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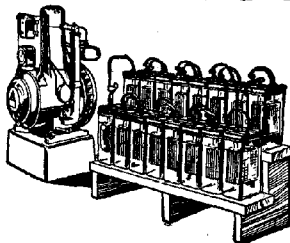
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owner's requirements may be sold at an enhanced value. *Pruning for Results.*—From every point of view pruning is disadvantageous to a fruit tree, but this does not mean that it ought to be dispensed with. A fruit tree is an example of a plant which has been developed by selection and cultivation till it has become abnormal or unnatural in treatment. It has been developed so as to bear a much heavier crop than it would naturally do, and to bear it at an earlier age. Such crops are greater than the branches can carry without injury, and hence if pruning is dispensed with the tree may be ruined. The simple conclusion, therefore, is that pruning should be reduced so far as consistent with the formation of a well-shaped tree, capable of carrying such a crop as it is likely to produce. The pruning will, of course, retard the development of the tree, but the extension of the branches is arrested more than the filling out of the branches, and hence a more compact and sturdier tree will be produced. It is during the earlier years, when the foundations of its future life are being laid, that pruning is of the utmost importance. Pruning in the strict sense of the word is but little required with trees in full bearing, because little new wood is made by them. That pruning encourages growth, under certain special conditions, is one of the fallacies prevalent in horticulture, a fallacy which can be readily exposed by considering the case when pruning is so excessive and oft repeated that no growth is allowed to occur at all, and investigation shows that it is fallacious even when not carried to such extremes. During the first few years in a young orchard aim at shaping the tree, having due regard to the distribution of fruit wood and main limbs. I remember some years ago being called to the assistance of a young grower who, book in hand, was trying to master the art of pruning. He had one difficulty—that of finding a tree to operate upon which was exactly the same as the illustration given in that book. Every tree has a separate existence, and the treatment meted out to each tree must be based on that tree's structure and capacity to respond to treatment. *Cultivation and Irrigation.*—Cultivation should be attended to, and not only should frequent hand hoeings be carried out, but the horses should be kept at work as much as possible. Light irrigation is better than heavy waterings. Do not be tempted to furrow out too close to the trees, but rather put in deep furrows well away from the trees. The water will ultimately reach the roots, and by watering in the manner indicated the roots will go down after the moisture, and a good root system is to be encouraged. There are fertilising elements in the subsoil as well as in the surface, and the greater depth the roots can be made to penetrate the better. If stable manure is available a mulch of this will have a wonderful effect in the early growth of the trees. Particularly in the block E country is cultivation necessary, and a fine pulverised surface is to be aimed at, as it retains the moisture. If gypsum were to cost about two pounds per ton more value would be attached to it, but as it can be had for the carting it should be used with freedom. Deep ploughing should be done; it is not necessary to plough right up to the stem of the young tree; ploughing to within a few feet is all that is necessary. If deep ploughing is practised a few roots may be cut, and because a few roots are cut do not for one moment think that this will in any way damage the tree. Main roots are not found on the surface if proper watering is adopted from the commencement, and any small roots cut on the surface will soon be replaced by new growth. *Pests and Diseases.*—The fruit grower should be thorough in his methods. A few concluding remarks may not be out of place with regard to the ravages of either fungus or insect life on the growth of the tree, and their influence on the fruit-bearing capacity later on. In the early years of a plantation it is essential to give particular care to keep the trees in a state of vigor and active growth. Any insect or fungus attacking a tree will impair that vigor. As a rule, unless a tree becomes partly denuded of leaves, or the damage done is so marked that it attracts attention from a distance, it is passed over with the remark, 'It is nothing, it will soon grow and get over its trouble.' Every successful horticulturist will pay attention to the small things which, in the long run, count for so much and make for success. Apricots are fairly free from pests, but there is a liability to get shot-hole fungus. Peaches suffer principally from curl leaf and aphids. Pears, prunes, and all trees are liable to some form of pest or another, and leaf-eating caterpillars or grubs may appear at any time. Citrus trees are attacked by a variety of diseases; fungus and

insect life in the form of scale, insects, and others. The color of the leaves and the growth of a tree will show the state of health in which the tree is, and is an indication, whether the tree is growing and healthy. Watch and act promptly. Learn to distinguish the insect friends from insect enemies. *Growing Profit Crops.*—There is one object to be aimed at—results. There are, or may be, several ways of obtaining these results. Many men prune differently, cultivate differently, and work their land on different lines, but all are in a greater or lesser degree successful growers. But there is one thing certain, that if you adopt a style or system in working, follow it out; do not change the style of pruning each year. If a tree is shaped and pruned properly a saw will never be required at pruning time. *Growing Profit Crops Between Trees.*—The practice of growing crops for profit between young fruit trees is a question that can well be discussed. There is a lot to be said in favor of growing a 'pot boiler' from a money-making point of view. My own ideas and experience, however, are distinctly against growing crops for profit between either vines or trees. It is not altogether objectionable to grow a crop in the autumn, but during the spring and summer growing period of the vines or trees the whole of the land should, in my opinion, be worked. If planted in the autumn the crops can draw on the soil moisture during the dormant period of the tree and not much harm is likely to result. Again, it may be argued that if thorough cultivation is done close to the row of trees or vines it will not result in any harm to the crop. On the other hand it must be pointed out that the drain on the soil is severe, and it is of the utmost importance to give the trees a fair start and not hazard in any way a check during that period.' At the conclusion of the paper Mr. Twyford asked what to do with peach trees suffering from curl leaf, and Mr. Levien replied that he would spray with lime-sulphur or the Bordeaux mixture—the latter probably—using it at the present time at summer strength. Mr. F. Cole said he had had a lot of experience with curl leaf. The time to spray with bluestone was just when the buds were opening and a little bit of pink could be seen—a period of about a week or 10 days. If they missed that period no spraying would do any good. If they were young trees the only thing they could do was to pick the leaves off and burn them. In reply to Mr. W. R. Woodham, Mr. Cole said the effect of curl leaf was on the setting of the fruit. Mr. Levien, replying to a query, said he considered that after the first watering a furrow 9in. from the stem of a young tree would be too close. For the first watering he advocated a basin irrigation, and for future waterings he could see no object in watering closer than about 3ft. The distance, of course, depended to an extent on the nature of the land. Mr. O. Weste said not half enough care was taken with the selection of young stock. Young stock took on the characteristics of the parent tree. He had recently inspected some young citrus trees in an Adelaide nursery, where he had contemplated getting some young stock. The citrus trees had hardly any fruit on them, and were covered with scale, and he had therefore not brought any young trees away with him. There was a big opening for a young nursery in Renmark, where the trees were acclimatised. With respect to stocks, the Chairman said that in Mr. Saies's orchard, which was at one time owned by Mr. Levien, some apricots had been worked on to plum stocks and the trees yielded good crops on alternate years. They were never regular, otherwise the trees seemed good enough. Mr. M. B. Geneste asked what was the right time to spray orange trees with red oil. Mr. Levien replied that the only time recommended by the people who produced the oil and the experts was from November until about the end of February—during the hot, summer months. In pruning they should consider the way they set up a tree. They should have the buds towards the prevailing winds. The influence on a particular bud depended on where the cut was made above it. In pruning generally he thought it a good plan to cut almost up to the bud above, and not too close to the bud from which the growth was to come. If they cut close to an outside bud on a fruit tree a callus would form and the bud might be partially damaged. The Chairman agreed with Mr. Levien. Cutting high up made an untidy looking cut, but is a good scheme. He had tried cutting close to the inside bud, so as to get a very weak growth, but the outside bud came away strongly. That was a good plan with trees like Kieffer's hybrid pears. Mr. T. Duggan asked if growers had had any experience with the worms which were prevalent in girdles this year. He had

five acres, and a small green worm—almost a grub—was making a wholesale job of the leaves. It was also tackling the weeds near by. He had been thinking of a sulphur spray. The Chairman advised the use of arsenate of lead. Mr. P. Wyatt—You want the same spray as for codlin moth, but of double strength. Mr. Leven said there was a good deal of trouble from this cause at Berri and Glossop and on block E. He advised spraying with arsenate of lead mixed with a little nicotine. The weeds should not be neglected, but sprayed also. The Chairman said small caterpillars were on everything this year. He had seen them on tomato plants and broom brush. In an article on spraying in the current issue of the *Journal of Agriculture* the use of flour was recommended. This prevented the spraying mixture forming into little globules. Mr. Wyatt said the use of flour had been recommended in recent years, especially for scale. Evidently it was coming into use in other sprays.

#### YOUNGHUSBAND.

October 28th.—Present: 18 members and one visitor.

CLEARING AND CROPPING.—“The first matter to receive attention when going on new land is to roll down the scrub, if it is light,” said Mr. S. R. Brinkley in a short paper. The scrub should be rolled in lands, say, four chains or five chains in width, and 30 chains or 40 chains long, he continued. That operation should be performed during the spring months, so that a very hot day, with the wind in the same direction as the land was rolled, could be chosen during March for burning. As soon as the fire was out, ploughing should be commenced. He thought the best varieties of wheat to sow on new land were Purple Straw, Darr’s Imperial, and White Lammus, because they had strong stems, and enabled the farmer to get his cocky chaff free from mallee bushes. It was impossible to cut hay satisfactorily on new land. When the wheat had been winnowed the cocky chaff should be stored in a dry place. The new land should be cropped three years in succession, twice with wheat and once with oats; it should then be left for two years. Before cropping the land again it should be fallowed to a depth of about 3in. or 4in. It should be cultivated a little later to kill the weeds. The best time to commence seeding was toward the end of March and it should be completed by the middle of June. He would advise farmers to let the land stand out for two years because they would then not be troubled with bushes. Every farmer should endeavor to keep his land free from rubbish if he intended building up a home. Strong fences should be erected and all breakages repaired. Everything should be kept in its place so that there would be no delay in finding it. A good discussion followed the reading of the paper.

BARMERA, November 26th.—The Manager of the Berri Experimental Orchard (Mr. C. G. Savago) and the Acting Secretary of the Advisory Board (Mr H. J. Finnis) visited the Branch and addressed the members of the proposed pruning competitions for the River Murray settlers.

GLOSSOP, November 12th.—Several members of the Berri Co-operative Packing Union, including Messrs. Downie, Curren, Moritz, Wishart, and Cheriton, attended the meeting of the Branch, and addressed the members.

GLOSSOP, November 23rd.—The Horticultural Instructor (Mr. Geo. Quinn) visited the Branch and gave a pruning demonstration. A meeting was also held in the evening, when Mr. Quinn addressed a large number of visitors and members on “The Possibilities of the Export Trade.”

KI-KI, November 5th.—A discussion took place on local matters of interest, such as roads, water, and general improvements for the district.

LONE GUM, November 23rd.—Mr. W. E. Muspratt (Inspector of Irrigation) visited the Branch and read a paper, “Drying and Handling Fruit.” A lengthy discussion followed, and numerous questions were answered by Mr. Muspratt.

MYPOLONGA, November 17th.—Mr. C. H. Beaumont (Orchard Instructor and Inspector) visited the Branch and gave a demonstration of summer pruning in Mr. Wright’s orchard. In the evening the Inspector read a paper, “Fruit Drying,” and replied to numerous questions.

PABILLA WELL, October 25th.—Mr. C. Mitchell (late A.I.F.) read an interesting and instructive paper, "Hints on Agriculture Abroad."  
POMPOOTA, November 3rd.—Mr. D. Turner read an interesting paper on "Poultry," and a good discussion followed.

### SOUTH AND HILLS DISTRICT.

#### BLACKHEATH.

November 20th.—Present: 10 members and visitors.

VEGETABLE GROWING.—Mr. E. H. Pym, in the course of a paper on this subject, said there were very few farms where small plots of land could not be set aside for the cultivation of vegetables for the use of the homestead. In places where water was not available for irrigating the plants, a damp piece of well drained land should be selected. Referring to manures, the speaker believed that the soils in their district would benefit from an application of lime for, in addition to making plant foods available, it sweetened the soil, and he did not think there would be so much bother with slugs and other pests of the garden. Two of the best manures that could be applied to the garden plot were well rotted stable and cowyard manure. Fowl manure would also improve the crops, especially those grown during the winter, but for summer vegetables, unless there was an abundance of water, that manure would prove too strong for the plants. The soil had to be kept in a nice condition, and if the land was hoed after every rain the moisture would be conserved and the weeds kept under control. Good seed should be secured, but if it was possible he suggested that each farmer should raise his own seed. Before transplanting was undertaken the plot should be given a good watering, and again after the plants had been set out. If the best results were to be obtained it was necessary to adopt a system of rotation of crops. An interesting discussion followed. Heads of Budd's wheat were tabled. Some of the heads were 8in. in length, and contained 117 grains of wheat.

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## LONGWOOD (Average annual rainfall, 37in. to 38in.).

November 27th.—Present: 10 members and one visitor.

**HOMESTEAD MEETING.**—The monthly meeting of the Branch was held at the residence of Mr. John Roebuck. After an inspection of the garden had been carried out, and afternoon tea partaken of, Mr. Lilling gave a short address entitled "Olives." The position and planting of the trees, he said, required a little consideration, because they were liable to injury from frost. They had a wonderful root system, but required systematic cultivation, and should be spaced about 24ft. apart.

## MOUNT PLEASANT (Average annual rainfall, 26.87in.).

November 12th.—Present: five members and one visitor.

**HANDLING A YOUNG HORSE.**—Mr. J. S. Miller contributed a paper on this subject. Training and handling should be commenced at an early age, when the mares were coming in with young foals, he said. He would not use a rope, but would get the foal in a place where it could not run back. A good tussle would do a great deal towards quietening it. When about five months or six months old it should be taken from its mother and tied up. It should be made thoroughly quiet on the neck rope, and some leading about would also be an advantage. A horse that was likely to hang back should not be tied up without having on a halter, and running the neck rope through the band. It would then be impossible for the horse to choke. Bags or tins should on no account be shaken in front of a horse if he was frightened. If a colt pulled back very determinedly, and made his neck stiff and sore, he should be let loose until it was better, and then tied up again. He could then be turned into a paddock with others until "breaking-in" time. When they were brought in again, they would appear to be very wild, but after moving among them quietly they could soon be caught in the corner of the yard, and would at once remember their former training, and quietly submit to being handled again. One great advantage of handling them as suggested was that if they met with an accident they could be caught for treatment. The age at which a colt should be broken in, depended, he said, on the class of work for which it was required. At about 2½ years the colt could be put to light work, and at 3 years or 3½ years of age it could do most work that would be required of it on the farm; but it should not go on the metal too much before it was at least 4 years of age. When it was brought in for breaking it should be caught as quietly as possible, and the halter or winkers put on. It should then be driven round, first to one side then to the other, being changed frequently to keep the mouth even. After a lesson or two, it could be harnessed, a pair of leather traces being included, and if the colt was quiet, after a few turns a light slide should be hooked on. It would then become accustomed to traces and guiding. It should then be gradually brought into other work beside other horses, being placed on the near side of a roller, trolley, or harrows preferably. A light colt for saddle and light harness work, if thought to be unmanageable after being handled with reins and traces, should be put in a wagon or harrows before going in a light vehicle. When on the road it should be driven or ridden with care, because it would be shy for the first two or three times. Motor cars or any strange object should be met where there was plenty of room, if possible. The horse, he said, should be educated for whatever purpose it was intended to be used by short and thorough lessons given frequently. A good discussion followed the reading of the paper, during which members expressed the opinion that it was important to exercise plenty of patience in connection with the handling of a young horse.

**ASHBOURNE, November 29th.**—The Superintendent of Experimental Works (Mr. W. J. Spafford) attended the meeting and delivered a lecture, in which he dealt with the following subjects:—Manures, oats, drainage, and flax growing.

**BLACKWOOD November 15th.**—Mr. C. H. Beaumont (Orchard Instructor and Inspector) visited the Branch and delivered a lecture, "Orchard Practice."

CHERRY GARDENS, November 23rd.—Mr. K. Jacobs contributed a paper, "The Benefits to be Derived from Membership of the Agricultural Bureau," and an interesting discussion followed.

CYGNET RIVER, November 25th.—The Hon. Secretary (Mr. J. J. Osterstock) read several articles on "Cutting and Stacking Hay" from the *Journal of Agriculture*, and an interesting discussion followed.

INMAN VALLEY, October 5th.—The Wool Instructor of the School of Mines (Mr. L. Codrington) visited the Branch and gave a wool classing demonstration at Mr. H. J. Dennis's farmstead. In the evening a lecture was given on "The Wool Outlook."

IRON BANK, November 26th.—An interesting discussion took place on the damage done by root borers to orchard trees. Several members intimated that they were carrying out experiments with a view of combating diseases of strawberries.

LENSWOOD AND FOREST RANGE, November 20th.—The monthly meeting of the Branch took the form of an inspection of Messrs. Schulz and Rowley's orchards. Considerable interest was shown in the spraying operations that were being carried out, and both members were complimented on the excellent appearance of the orchards.

MORPHETT VALE, November 18th.—Several subjects of local interest were brought before the meeting for discussion. A splendid sample of Indian Runner wheat (7ft. 4in. in height) was tabled by Mr. E. Hunt. It was estimated that the crops would yield from four to five tons of hay per acre. Owing to the approaching harvest operations it was decided to go into recess until February, 1921.

SHOAL BAY, November 25th.—Mr. Tiggeman read a paper, "Potato Growing," and a keen discussion followed.

STRATHALBYN, October 26th.—Mr. W. Saltmarsh contributed a paper entitled "Husbandry"; touching on many industries connected with agriculture. Mr. G. Bamfield then addressed the members on the "Rearing and Feeding of Calves." The Chairman (Mr. S. Bottrill) gave an interesting account of his trip to the Point McLeay Mission Station.

## SOUTH-EAST DISTRICT.

### KONGORONG.

November 25th.—Present: 18 members and visitors.

GRUBS IN OATS.—Mr. F. W. Perkins, in opening a discussion on this subject, remarked that grubs had again made their appearance in the oat and flax crops of the district, and he asked members to suggest remedies for combating the pest. Mr. W. Aslin said he did not think that the small green grub that was found in the gardens was the same as that causing damage to the field crops. The grubs appeared to breed in the soil, and travelled from paddock to paddock. He had noticed that if the weather was very hot for a day or two the grubs would be killed. He had also observed that the insects did not touch the crops until they were nearly ripe. Mr. Perkins said that on one occasion he had seen a green crop attacked by the pests. Mr. C. T. Atkins said that if farmers waited until they saw the grubs in the crop and then broadcasted a bushel of bran mixed with paris green the grubs would be destroyed. He had also noticed that as a rule a few hot days generally checked their progress. Mr. W. Aslin thought it was a good plan to make a ditch around the paddock containing the crop, so that when the grubs commenced to travel they would fall into the furrow and be unable to get out. Mr. Atkin did not think the ditch a very successful method of coping with the pest. If the grubs were very bad they soon filled up the furrows, and others were able to cross over.

**MILLICENT (Average annual rainfall, 29.25in.).**

November 27th.—Present: 12 members.

**FARMERS' BOOKKEEPING.**—Mr. J. J. Mullins, in initiating a discussion on this subject, considered that bookkeeping was a most important matter to farmers, but one that was often neglected. Separate accounts of receipts and expenditure should be kept. In the case of livestock purchased or sold, the amounts received and commission paid should be recorded. The dates of sowing, harvesting, and other particulars should be entered in a diary kept for the purpose. In the livestock account he kept records of all stock on hand, lambs marked, sheep shorn, &c. A record of the averages of the different paddocks should also be kept. Mr. Holzgreffe said he would enter the particulars of all farm produce sold under separate headings. He also kept a diary of all daily operations on the farm. Messrs. Hart, J. Guerin, Mitchell, and Mullins also spoke on the subject.

**MOORAK.**

November 25th.

**SHELTER FOR STOCK.**—Mr. H. S. Tarrant read the following paper:—"I consider the provision of shelter for stock a most important matter on farms at Moorak, because the land is so open to the cold weather during the winter months, and lacks shade in the hot weather. When we take into consideration the fact that the stock provide us with our means of livelihood, we should make some suitable

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place of shelter for them. A small number of settlers have moved in this direction by planting pines and hedges on their holdings. I would recommend the planting of *Pinus insignis* in rows of about 6ft. apart, with a row of tree lucerne on the lee side, and a row of *Boobialla*. The plantation should run in a northerly and southerly direction, with a wing at either end about a chain long, according to the quantity of stock requiring protection to insure against weather coming from north or south. This plantation should be planted in an open paddock, so that the stock could run on any side. With these trees growing, there should be no openings, and when sufficiently high I would suggest topping them. The plantation should be protected with a strong stock-proof fence some distance from the trees, or the stock in the summer time, when green feed is scarce, are apt to eat them. As the trees mentioned are easily procured in our district there should not be much inconvenience in procuring them, while in time to come the wastage from such plantations would be very useful for many purposes on the wood heap, which at the present time is a big consideration. Some people will think the land will be robbed of a certain amount of moisture; no doubt it would, but, on the other hand, a farmer cannot easily value the amount of benefit the stock are receiving. This, I think, would more than compensate him for the loss of the grass or crop he would sustain. I feel sure that, should any settler make a small plantation on his holding, it would not be many years before he would be fully recompensed for his outlay."

At a further meeting held on December 16th, Mr. W. Palamountain read a paper, "Suggestions for Awakening a Keener Interest in the Work of the Agricultural Bureau."

#### MOUNT GAMBIER (Average annual rainfall, 32in.).

November 13th.—Present: 15 members.

(COWS VERSUS SHEEP.—In the course of a paper under the title, "Are Dairy Cows more Profitable than Sheep on a Farm of not Less than 80 Acres in this District," Mr. F. B. Davidson said of late seasons cows and sheep had yielded good returns, but while the price of milk had risen the price of crossbred wool had gone down. Notwithstanding such fluctuations, he was inclined to think that sheep would more than hold their own if rotation crops were systematically grown throughout the whole of the year. Dairy cows were always fed during the winter, and sometimes during the summer, leaving only the spring months in which they had to forage for themselves. He believed he was quite safe in saying that 20 sheep could be fattened to an acre of growing crop; and after they had been taken off, and the crop allowed to grow again, five more could be added, giving 25 sheep to the acre. He did not mean poor sheep, but fair stores, which could be purchased at any time when they were not too dear, and kept on, say, 40 acres of grassland, and using the other portions for rotation crops. Or else, if the market was suitable, small lots could be purchased as the others were sold, and if one had bought at good prices, £1 per head should be cleared on the stock. That could go on indefinitely. At average prices for milk three cows should bring in about £25 per head, or £75 per acre per year. Sheep could be fattened in less than three months, but if they were fattened in drafts, four times a year, that would yield £100 an acre against the cows £75. High prices had to be paid for cows that were worth keeping, and the best thing to do with the bull calves was to cut their throats as soon as they were born. It would cost about £5 per head to feed them properly, and in 12 months' time, if put into the sale-yard, £4 per head might be realised for them. Then there was no doubt that cows were a great tie, as someone always had to be on hand at milking time, and one could not rely on outside labor for that work. Some of the skimmed milk could be used for pigs, but against that there would be the wool from the sheep. In the discussion that ensued, Mr. G. Gurry said an 80-acre farm was not large enough to make sheep a paying proposition. If the farmers adopted a system of intense culture he thought they would make more out of the cows. He favored the cow on good, or even second-class land. Mr. Davidson had said they should



destroy the bull calves. That might be best in individual cases, but from a national point of view he did not think it would be a good thing. They wanted to increase the flocks and herds of Australia. Mr. W. A. Palamountain spoke in favor of the cow. He did not like sheep on a small area. He had 65 acres, and had taken £85 a month from less than 30 cows. Other members, including Messrs. Sassanowsky, Pritchard, Aslin, and Birk also spoke.

#### NARACOOORTE, (Average annual rainfall, 22.60in.).

November 13th.—Present: 17 members.

FARM MANAGEMENT.—The following paper, under the heading "How to Lay out Farm Paddocks to the Best Advantage," was read by Mr. J. M. Wray:—  
 "After 10 years experience on the Hynam land I have come to the conclusion that wheat growing is only payable on certain land, of which there is not a very large quantity, so that the best thing to do is to grow oats to ensure plenty of hay, and a little wheat on the picked spots, and go in for cows, pigs, and sheep. It had been the custom to have paddocks that were suitable for large teams to work in for cereal growing, as it served the purpose fairly well, and saved the expense and labor of a lot of extra fencing. But when it is desired to change from cereal growing to stock raising quite a different problem confronts us. At the very beginning, however, one must consider the fencing seriously, not because it should be done well, but that it should be placed in a line where it will serve its purpose for a generation. The main line having been surveyed and carefully erected, the erection of branch fences for small paddocks can be carried out from time to time. Too much cannot be said of the advantage of a number of small paddocks ranging in size from an acre upwards to, say, 100 acres. Of course, the size of larger paddocks depends simply upon the class of land and the acreage the farmer possesses. All the smaller paddocks should be placed as near to the homestead as possible in order to save time. Each paddock should be placed so that ingress and egress is simple, quick, and easy. If possible, lanes should be fenced for this purpose, as they simplify the work of shifting stock from one place to another. This entails more work and expense, but if carried out in the first place will prove a pleasure and a comfort. The next thing to consider is water. A paddock loses in value and production if not served in some way or other by water. Cows for instance drink a lot of water, and unless they have free access to good, clean water, where they can get as much as they require whenever they like, especially in hot weather, they will not give maximum results. Then again, sheep may become ill, or in bad months you may get extra weak animals that it will pay to feed on their own, and unless a small, convenient paddock is provided and water laid on you are handicapped at once. If, say, six paddocks are fenced off to start with, of an acreage of 1, 3, 6, 10, 15, and 20 acres respectively, it is really surprising in how many different ways they can serve you to great advantage. I will deal with No. 1. This can be used as an early greenfeed plot, and later it can be used for potatoes or a summer crop; and then serve, if properly sheltered, as a sleeping paddock for the cows. The following year it will be in better heart than ever for a rotation of crops. It also can be used as a run for pigs. No. 2 will serve in a similar manner to No. 1, but, being larger, will make an excellent place to paddock the rams, a hack or pony, pet lambs, or calf paddock. No. 3 can be used alternately with Nos. 4, 5, and 6 for pease, oats, wheat, or greenfeed, and summer crops. The last numbers, to my mind, are excellent sizes for growing pease for grain, because if you have too large an area in one field you will possibly be a heavy loser, not being able to get the sheep on to them early enough on account of wishing to harvest next year's seed. Hence the advantage of having an area that one can handle quickly. Now the greatest drawbacks that settlers on the light soils have are sorrell and rabbits. It is simply useless to think of making the farm pay with a swarm of rabbits spoiling your efforts and laying the land and crop waste year after year. The time to destroy rabbits is when there are only a few on the property. The method is to kill by hand, dog, or poison. Do not wait to be asked to do it, but do your duty to your district, your neighbor, and yourself. Having got rid of all rabbits on this light soil you will soon be prevented from growing

crops of all kind because of sorrel. This plant is welcomed by some, who claim that it is a good feed for sheep. I believe it is, but it must have the season to suit it. I believe this ground will produce 90 per cent. more feed without the sorrel than with it. Sorrel is proof that the soil is sour. Anything that will sweeten the soil will kill it. It can be reduced by summer cultivation and you may get a good crop, but the land is not improved. Here is the advantage of the smaller paddocks. You at once increase your stock, being better able to handle them, you will have more manure in your yards, you will increase your shelter, stacks, or sheds; and in so doing, in a year or so you will find the sorrel disappearing and better grasses growing in its place. Again, liming the soil kills the sorrel, increases the oat and pea crops, and fills the paddocks with sweet, vigorous grasses and clovers. Liming is expensive, but if the paddocks are small you will have a chance to lime one, when I am sure you will lime a second after seeing the results of the first. What the farmer on this land has to face is sourness of soil; then let us aim at smaller paddocks, increase in stock, and more farmyard manure. Endeavor to lime, because it will pay; kill the rabbits, for in doing so we shall help the country, ourselves, and our fellowmen." In the discussion that followed Mr. Bray said he had proved from experience that summer fallowing for killing sorrel impoverished the land. For killing sorrel he favored scarifying in November or December; then using the cultivator at the beginning of the year, and again in February. The sorrel was killed and a good crop followed. He had found late disc ploughing for sorrel successful. Sorrel was a good summer fodder, and excellent feed for sheep. Lambs that depastured on it were not troubled with worms, and if they grazed on it for two or three years they would kill the plants. Mr. Hahn said that he quite agreed that summer cultivation when dry did not eradicate sorrel, as the soil became too fine. It would be better to cultivate the soil when moist and then put sheep on it. Mr. Bray said he omitted to mention that when cultivating with the scarifier to eradicate sorrel they should use the harrows. The sorrel must be brought to the top to kill it. Mr. Donoghue said he had proved that lime was not effective in destroying sorrel. Mr. Wray said he had proved that lime would kill sorrel, and small paddocks were handy for experiments of that sort. He had used two tons on two and a half acres, and found that it eradicated the sorrel. The cause of sorrel coming up was the sourness of the land, and to get good pasture they must sweeten their land. The lime took some time to become efficacious in the soil after being applied. Mr. A. Johnstone said that the proper way to apply lime was to plough it in, but before being thoroughly effective it must be consolidated with the soil. Mr. C. Drake showed a nice sample of potatoes (pink-eye variety).

#### PENOLA (Average annual rainfall, 26.78in.).

November 6th.—Present: 10 members.

**SHEARING OPERATIONS.**—In a paper dealing with this subject, Mr. F. J. Kidman said before the commencement of shearing all the sheep should be classed for culling, and all dags removed. The shed should be thoroughly cleaned out, care being taken to see that pieces of string and chaff were not left lying about. The appointments of the shed should provide for plenty of room for wool space, bins conveniently situated to the table and press, substantial fences between each port hole, and pens large enough to hold at least 30 sheep. Directly the sheep had been counted out the marking should be done. By keeping the board swept clean after each sheep was shorn the danger of locks getting among the fleece would be minimised. In the event of a sheep receiving a cut some disinfectant should be immediately applied to keep flies away. The preparation of small clips could be divided into two divisions, i.e., skirting the fleece and classing the wool. The main points to be considered in classing were, length of staple, quality and diameter of fibre, condition, yolk, and vegetable matter. The brightest and best grown fleeces should be placed in one lot, and all discolored and poor conditioned fleeces in a lower grade. Those directions applied when one was handling Merino wool, but when crossbred fleeces had to be classified a knowledge of the various types was required. If all the wool was free from

seeds and other vegetable matter very light skirting was permissible, because only the stained pieces had to be removed; but burry wool demanded a different treatment. If the burrs were only confined to the skirts of the fleece sufficient wool should be removed from affected parts, but as the skirtings would be very bulky it would be necessary to again trim them and remove the dirty ends of the fleece. If the full value was to be received from the wool every bale should be carefully packed with wool true to type, and clearly branded with the number, name of the farm, and description of wool. An interesting discussion followed.

#### TANTANOOLA.

October 23rd.—Present: 18 members.

**LIMING THE SOIL.**—The following paper, under the heading of "Soil Fertility," was read by a member:—"One of the chief reasons why people add lime to the soil is because it makes clay soil lighter and sandy soil firmer. Further than that, it should be realised that without the assistance of lime soil containing potash and nitrogen cannot give its chemical constituents to plants, because by the use of lime the land is placed in a better mechanical condition, soil acidity is corrected, and soluble plant foods are made available. By improving the mechanical condition of the soil it enables one to conserve more moisture, and the biological condition of the soil is improved, thereby ensuring a vigorous beneficial bacteria flora, which will enhance the fertility and productive power of the soil, it will also slightly increase the temperature of the soil. Certain manures deplete the soil of carbonate of lime, and this must be replenished. An application of carbonate of lime, say, at the rate of one ton per acre in the autumn on land which is sour, will remove the acidity. It is well known that a large proportion of land in the South-East, owing to the wet nature of the soil, would be better for a dressing of lime. In many ways the liming of land has proved of beneficial influence on both maintenance and enhancement of soil fertility. Hitherto the use of lime in this State has oftentimes been regarded by many farmers as an expensive luxury, and much the same incredulity has been expressed concerning its benefits as a regular means of maintaining or increasing soil fertility as was voiced regarding the use of superphosphate at the time of its first introduction by Professor Custance, of the Roseworthy Agricultural College. The fact is, that in the evolution of agriculture in this State, and from the standpoint of soil fertility, we have not yet quite reached the third stage. Our first was the cultivation of virgin land unassisted by manure of any kind. The second stage was reached when it was realised that the surface soils of this State were below the average in phosphatic content and by frequently cropping they were becoming clearly depleted to a point below the essential fertility that even the use of superphosphate was advised, and became general. The increase in values of land now demands that its productive value must be increased also, and the continued cropping and the use of superphosphate has tendered in some districts to the souring of the soil, which calls for further assistance in the maintenance of fertility. One of the directions, and there are doubtless many, in which this assistance may be given is in the judicious use of lime."

**LUCINDALE**, December 4th.—The Hon. Secretary (Mr. P. H. Dow) urged on members the necessity for taking a keener interest in the work of the Bureau. It was decided to draw up a programme and invite an officer of the Department of Agriculture to give a lecture under the auspices of the Branch.

**MUNDALLA**, December 1st.—Mr. R. Saxon read a paper, "Shearing Lambs." The question of "Scrub Clearing" was also brought before the meeting for discussion.

# CROWN LANDS.

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## LANDS TO BE OFFERED SHORTLY.

Additional allotments in the town of Whyalla (Hummock Hill) will be offered at auction at an early date.

Full particulars will be published in the *Government Gazette*, and plans will shortly be available on application to the Secretary for Lands, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portion of a block, if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey.

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## ALLOTMENTS, SALES, TRANSFERS, SUBLEASES, AND MORTGAGES.

Notice is hereby given that in future no applications for land, or for transfer, sublease, of mortgage of Crown leases or agreements will be approved to unnaturalised persons of any nationality, or to naturalised persons of enemy origin unless the consent of the Honorable the Attorney-General of the Commonwealth be first obtained by the parties making the application.

Where any doubt as to nationality exists, it will be necessary for certificate of birth or naturalisation papers to be exhibited.

The same principle will apply to land sold by auction.

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## OFFICIAL LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which may be seen at the principal Post Offices, and copies obtained at the Office of the Secretary for Lands. The List shows the Areas, Localities, Prices, &c., of the Sections available and the conditions under which they may be applied for.

G. R. LAFFER,

*Commissioner of Crown Lands and Immigration.*



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